

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Weekly Newspaper

Second-class postage paid at Framingham, Mass. and additional mailing offices ©1983 by CW Communications/Inc.

\$1.50 a copy; \$44/year

September 26, 1983

Vol. XVII, No. 39

SPECIAL REPORT

Inside —
Weathering the Micro Storm



Custom, Prewritten Software Different

Taxable Software Decision Upheld

By Bill Laberis
CW Staff

DETROIT — In an apparent victory for users and vendors of mainframe software, the Michigan Supreme Court has upheld a state appeals court decision differentiating between custom and prewritten software for sales tax purposes.

The high court's summary judgment verified the lower court ruling, stating, essentially, that software programs requiring periodic maintenance, updating and

documentation are intangible and, thus, not subject to state sales taxes.

"Customized computer software programs should be distinguished from canned software programs, TV games, albums and cassette tapes, because the latter are all end products themselves," the court ruled. "The focus of the instant transaction is on the personalized service of the software vendor — an intangible transaction."

For the most part, state

sales taxes apply only to those items considered tangible. The tax, where it applies (Continued on Page 8)

IBM's 4381, 4361 Slam Window on PCM Mart

By Ed Scannell
CW Staff

IBM's recent introduction of its 4381 and 4361 mainframes slammed the last marketing window on the fingers of the plug-compatible

manufacturers while greatly improving its competitive position against 32-bit mini makers, industry watchers believe.

The 4381, code-named "Glendale," fills the price/performance gap between the company's 4341 Model Group 12 and 3083 Model Group E mainframes that PCMs have been walking

through the past couple of years.

But with the 4381 — the first low-cost MVS/XA-compatible system that processes

between 2 and 2.4 million instructions per second in commercial applications and between 2.5 and 3 Mips in scientific applications — PCMs will be scrambling over the next few months to cut prices, boost performance or put MVS/XA up on their machines, analysts say.

IBM's strategy with the 4381, some analysts contended, is to provide an attrac-

(Continued on Page 15)

Top-End, 32-Bit Mini Caps Honeywell DPS 6 Family

By Ed Scannell
CW Staff

WALTHAM, Mass. — Honeywell, Inc. last week unwrapped its most powerful 32-bit system to date, as well as two 16-bit systems that can be field upgraded to 32-bit levels. The system introductions completed a realignment of the firm's DPS 6 family of minicomputers begun earlier this year.

Intended to replace existing mid- and upper-range DPS 6 systems, the 32-bit DPS 6/95 and 16-bit DPS 6/45 and 6/75, like the micro-

systems 6/10, 6/20 and DPS 6/40, all run the company's Gcos operating system. Honeywell contended that this marks the first time a major vendor has allowed systems ranging from desktops to superminis to use the same software without making any modifications.

Honeywell also announced:

- Price reductions on its DPS 6 64K-byte memory expansions from \$12,000 per 1M byte to \$9,000. Reductions were also made on the firm's 256K-byte packs from \$3,000 to \$2,000 and its 256M-byte storage units from \$33,000 to \$25,000.

- Two high-speed, DPS 6-, 7- and 8-compatible line printers that print at 1,200 and 900 line/min, respectively.

- Enhancements to its Totalcare customer service program, including the Remote Support Facility that allows

users to monitor their own remote systems (see story Page 4).

At \$80,000, the basic version of the top-of-the-line 6/95 costs \$40,000 less than the previous high-end machine, a spokesman said. This ver-

(Continued on Page 4)

Cullinet Pact To Create Tie With Apple At Standstill

By Katherine Hafner
CW Staff

BOSTON — Just one day after Cullinet Software, Inc.'s annual meeting earlier this month, the software company and Apple Computer, Inc. all but scrapped an agreement to develop jointly a software interface providing Apple's Lisa computer with access to mainframe data.

Viewed by industry analysts as a major endorsement of the Lisa as a viable part of IBM mainframe environments, the agreement to link the personal computer to mainframe-based corporate data bases through Cullinet's Information Database was announced April 19 in a flurry of enthusiasm. Six months later, in the wake of disagreements over marketing and development strategies, the deal appears to be at a mutually agreed upon standstill.

"From the very beginning, it was perceived as a very good deal for Apple, because it got it into the IBM mainframe environment, where it would otherwise have difficulty going," Robert Goldman, Cullinet's president, commented. "For Cullinet, it really had no impact, at least in the short term."

While stressing that Cullinet has not "closed any doors or pulled up the bridge" on its relationship with Apple, Goldman said the fundamental problem with the agreement lay in "a basic misunderstanding... as to who would do what" in the development, marketing and support of the interface (Continued on Page 6)

Inside

Europe on a dollar a day? Maybe not, but a Swedish company is offering California firms the chance to cut time-sharing costs by as much as 50% by buying time on computers located just outside Stockholm rather than in the U.S. Page 10.

Hewlett-Packard Co. has thrown a competitive punch at IBM by offering a system that costs slightly less than the Personal Computer and boasts a touch-activated display screen. Page 9.

Debate on the safety of video display terminals could heat up following the ratification of a first-of-its-kind contract by an office workers' union at a Boston college, acknowledging past reports of problems encountered by pregnant women who use these devices. Page 2.

The DP industry may not have gone Hollywood yet, but a number of firms have turned to familiar prime-time TV and sports figures to peddle their products to a star-struck public. Page 48.

Northern Telecom, Inc. has unveiled a series of products aimed at increasing the data handling capabilities of its SL-1 digital private branch exchange. Page 79.

Sharing secrets on protecting trade secrets has become a necessary strategy for firms in California's highly competitive Silicon Valley. Page 101.



TM reg. U.S. Pat. Off.
Editor John C. Whitmarsh
Managing Editor Rita Shoor
News Editor Cheryl M. Gelb
Technical Editor Timothy J. Scannell

Senior Editors:
Software Paul Gillin
Communications Phil Hirsch
Jim Bartimo
Systems Ed Scannell
Office Automation Jim Bartimo
Industry Bill Laberis
Features George Harrar
Susan Blakeney
International Editor Tom Henkel
Writer/Analyst: Katherine Hafner
Staff Writers: Patricia Keefe
Peter Bartolik
Lynn Haber
John Gallant

Correspondents:
New York David Myers
Washington, D.C. Jake Kirchner
West Coast Robert Batt
Jeffrey Beeler
Features Coordinator Barbara Van Scoyoc
Chief Copy Editor: Donovan White
Assistant Chief Copy

Editor: Kathie Gow
Copy Editors: Becky Batcha
Dave Bouffard
Bruce Crane
Betsy Morse
Deborah Scaduto
Thomas Schmidt
Charlotte Ziems

Assistant to the Editor: June Fetting
Editorial Assistants: Joyce Furia
Mary DeCristoforo

Contributors:
Education J. Daniel Couger
Human Connection Jack Stone
Lecht on Science Charles P. Lecht
Softline Werner L. Frank

SPECIAL PUBLICATIONS
Computerworld Extra!
Editor Bruce Hoard
Copy Editor Patti Hartigan
Computerworld On Communications
Editor Bruce Hoard
Copy Editor Patti Hartigan
Computerworld OA
Editor Ann Dooley
Staff Writer Glenn Rifkin
Copy Editor Nancy Fleming
Computerworld Buyer's Guides
Editor Marcia Blumenthal
Copy Editor Rick LePage

Please address all correspondence to the appropriate department at Box 880, 375 Cochituate Road, Framingham, Mass. 01701. Phone: (617) 879-0700. Telex: 95-1153.

OTHER EDITORIAL OFFICES
& SALES OFFICES:

New York: Suite 7G, 401 East 80th St., New York, N.Y. 10021. Phone: (212) 570-2135.

West Coast: 257 Lytton Ave., Palo Alto, Calif. 94301. Phone: (415) 328-8064.

Washington, D.C.: 880 National Press Building, 529 14th St. N.W., Washington, D.C. 20045. Phone: (202) 347-6718.

England: Terry Cartwright, EEC Publications, 196-200 Balls Pond Rd., London N1 4AQ. Phone: 01-359-3525. Telex: (851) 894085 (Computer Management, Computer Business Europe only).

W. Germany: Eckhard Uspadl, CW Publikationen, Friedrichstrasse 31, 8000 Munich 40. Phone: (089) 38172-0. Telex: 5215350.

France: Axel Leblais, Le Monde Informatique, 185 Avenue Charles De Gaulle, 92200 Neuilly Sur Seine, Paris. Phone: 758.14.14 Telex: 613234 F.

Japan: Mr. Shuji Mizuguchi, Computerworld Japan, 7-4 Shintomi 1-Chome, Chuo-ku, Tokyo 104. Phone: (03) 551-3882. Telex: 252-4217 (Computerworld Japan only).

Esteban H. Yamada, Tokyo Representative Group, Yamaguchi Bldg., 2-12-9 Kanda Jimbocho, Chiyodaku, Tokyo 101. Phone: (03) 230-4117/8. Telex: 126860 (reps for all CWCI publications except Computerworld Japan).

Australia: Alan Power, Computerworld Pty. Ltd., 37-43 Alexander Street, Crows Nest, NSW 2065. Phone: (02) 4395133. Telex: AA74752 COMWOR.

Brazil: Eric Hippeau, Data News, Computerworld do Brazil, Servicos e Publicacoes Ltda, Rua Alcindo Guanabara, 25/10th Floor 20031 Rio de Janeiro, RJ Brazil. Phone: (021) 240-8225 Telex: 2130838(WORD BR).

Mexico: Richard Small, Computerworld de Mexico, Oaxaca 21-2, Colonia Roma, Mexico City 7 D.F. Phone: (905) 514-4218, (905) 514-6309. Telex: 1771300 ACHAME. 1777809 ACHAME.

Spain: Neil Kelley, Computerworld/Espana, Gravia, 13, Madrid 4. Phone: 231-23-85, 231-23-86, 231-23-88. Telex: 47594(CW E).

Denmark: Preben Engell, Computerworld/Denmark, Gammel Strand 50, 1202 Copenhagen K. Phone: 01-1234-11. Telex: 27566 cwdan.

Sweden: Bengt Marnfeldt, Computerworld/Sweden, Nova Media AB, Vartavagen 55, 11538 Stockholm. Telex: 8105099 NOVACW.

The Netherlands: Johannes A. Witvoet, Mgr. Dir., CW Communications B.V., c/o IDC Benelux, Prins Hendriklaan 11 1075 Ax Amsterdam. Phone: 020-791-692 Telex: (844) 15741.

Italy: Daniele Combini, Gruppo Editoriale Jackson, s.r.l. Via Rosellini 12, 20124 Milano.

Argentina: Ruben Argento, Gen. Mgr., Computerworld Argentina, Av. Belgrano 406-Piso 9, CP 1092 Buenos Aires. Phone: 34-5583/5584.

Second-class postage paid at Framingham, Mass., and additional mailing offices. Computerworld (ISSN-0010-4841) is published weekly, except February (5 issues), April (5 issues), May (6 issues), June (5 issues), August (7 issues), September (5 issues), October (7 issues), November (6 issues), December (4 issues) and a single combined issue for the last week in December and the first week in January by CW Communications, Inc., Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

Copyright 1983 by CW Communications, Inc. All rights reserved.

PHOTOCOPY RIGHTS: permission to photocopy for internal or personal use, or the internal or personal use of specific clients is granted by CW Communications for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of \$3.00 per copy of the article, plus \$5.00 per page is paid directly to Copyright Clearance Center, 21 Congress Street, Salem, MA 01970.

Permission to photocopy does not extend to contributed articles followed by this symbol. ‡

Special requests should be addressed to Nancy M. Shannon, CW Communications, Inc. Box 880, 375 Cochituate Rd., Framingham, MA 01701. ISSN 0010-4841/83 \$3.00 + \$5.00. \$1.50 a copy U.S. — \$44 a year, Canada Central & So. America — \$110 a year, Europe — \$165 a year, all other countries — \$245 a year (airmail service). Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

POSTMASTER: Send Form 3579 (Change of Address) to Computerworld, Circulation Dept., Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

Possible Precedent Set

Union Contract Targets VDT Users

By Lynn Haber
CW Staff

BOSTON — In a precedent-setting move, a union representing office workers at a university here has ratified a contract that acknowledges reports of problems encountered by pregnant women who use video display terminals (VDT) and offers work alternatives. The contract is believed to be the first of its kind in the country.

In its 1983-85 contract, District 65, United Auto Workers Union, which represents clerical workers at Boston University (BU), seeks to protect pregnant VDT workers by specifying certain options that give them the choice of transferring from VDT-related tasks to work that does not require the use of a VDT.

According to Sue Parsons, chairwoman at the BU Local District 65, approximately 60% of the clerical workers at the university use VDTs.

Paragraphs 1 and 2 of Section 2 covering VDTs under Article 18 on Health and Safety of the new contract reads as follows:

“● The university will make every reasonable effort to ensure that workstation designs are appropriate for VDT use. Toward this end, the university will provide all departments using VDTs with a set of advisory guidelines on their appropriate installation and utilization.

“● Although research to date has not proven that VDTs are a health or safety hazard, in recognition of employee concern about the potential adverse effects involving pregnancy, the university agrees to the following: Upon request, the university will attempt to reassign a pregnant employee to work which does not re-

quire the use of a VDT. If such reassignment is not practicable, the employee, upon request, may be granted a Personal Leave up to three months under Article 39, which shall be in addition to any other leave under Article 39 for which she may be eligible.”

First VDT Language

Organized with District 65 since April 1979, clerical workers at BU first incorporated VDT-specific language into their 1981-83 contract. This language was concerned with eye protection for VDT users and encouraged yearly eye examinations.

Since the previous contract, increased public information regarding the potential health risks associated with VDT use, some of which include eye and vision problems, back, neck and shoulder fatigue, job stress and pregnancy problems, has spurred the union's members to take action.

“The more research that came out, the more agitated people were becoming,” Parsons said. “The final reaction was to include language in the contract to protect workers from potential health risks associated with VDT use.”

The union's contract victory is the result of “long and hard work by the union's Health and Safety Committee,” Parsons said. The committee surveyed employees, conducted research, met with management and issued its own guidelines before negotiating the new contract language.

According to Jenny Hochstadt, a union local officer for health and welfare, health complaints associated with VDT use were not uncommon.

“In overall complaints, we had a

zillion,” Hochstadt said. “The majority of these complaints had to do with headaches, eyesight and numbness in a user's hands.”

The gravest VDT-related health problem at BU was a pregnancy statistical cluster report from the Information Services Office. Over the past 3½ years, five out of five pregnancies of workers at that office were problem pregnancies. According to Hochstadt, the Information Services Office has a history of being the department at the university where VDTs were installed and used for the longest period of time.

According to information from Boston's 9 to 5 organization for women office workers, since July 1980 women VDT operators in eight work places across the country have reported extremely high rates of miscarriages and birth defects.

The inclusion of VDT-specific language in the recently ratified union contract between District 65 and BU is probably just the tip of the iceberg in the controversial arena where some groups want to regulate VDT use in the work environment and others stand by the claim that no scientific studies to date attribute permanent health defects to VDT use.

Statistics indicate that between seven million and 10 million VDTs are presently in use across the nation, and office automation in the U.S. is growing steadily.

Efforts to regulate VDT use have been seen in the state legislatures as well as in the unions. VDT bills have surfaced in six states including Massachusetts, Connecticut, Illinois, Maine, Oregon and New York, but as yet none have been passed into law.

This Week

SPECIAL REPORT ON WEATHERING THE MICRO STORM Follows ID/36

IN DEPTH

Information as Corporate Asset Follows Page 64
Software Maintenance ID/13
A Hard Stand on Software Protection ID/23

NEWS

Cincom Systems' Ultra DBMS Out for VAX-11 6
HP's Model 150 Micro Expands Disk Family 8
Model 150 Puts HP Into Mainstream Micro Fray 9
Calif. Users Offered Access to Swedish CPUs 10
Keynoter Calls for Standardization, Cooperation 11
Development of Operative Languages Urged 12
Debate Rages Over Ways to Simplify Languages 13
Future of Distributed Systems Seen Clouded 14
Supercomputers Seen Gaining in Corporate Use 16
U.S. Supercomputer Support Crucial: Committee 17
International Report 18
Swedish Firm Launches Semiconductor Blitz 19
U.S. Urged to Support Job Training Programs 21
Effective DP Managers Seen Nontechnocratic 23
User Suits Give Rise to 'Malpractice' Insurance 24
Turnaround Time 26
Cooperation Seen Key to System Integration 27
DSS Planning, Strategy Urged 31
University's Tape Library Supports 200 Users 32
Packages Help Schools Manage Students 33
Insurer's Network Cuts Paperwork 34
Relational DBMS Provides Utility Flexibility 35
Bank Takes OA Path to Hike Productivity 37
Superintendent Calls for DP Ethics Curriculum 38
Is It a Minicomputer or a Microcomputer? 39
More Firms Seen Turning to Micros 40
Meet Attendees Envision Decision Support 42
Exec Urges Shifting Focus in DBMS Purchase 43
Reagan Unveils R&D Antitrust Immunity Bill 44

EDITORIAL

Editorial: Trouble in Paradise 60
The Data Center: Crisis: MIS Inertia 61
Human Connection: Foreign Intrigue DP Style 61
Getting Ahead in DP: The Internal DP Resume 64

SOFTWARE & SERVICES

Unicalc Unwraps Spreadsheet Package 65
QCM Performance Monitor Enhanced 66
Package Provides 3270 Emulation 67
IMS Introduces On-Line Tool for System/38 68

COMMUNICATIONS

Northern Telecom Enhances SL-1 PBX 79
Bitek System Monitors PBX Ports 84
Input Module Boasts Bus Compatibility 85

SYSTEMS & PERIPHERALS

DEC Expands LSI Line With J-11-Based Board 87
CAD System Targets Printed Circuit Uses 88
SMC Plans to Unveil SMP/8301 90

OFFICE AUTOMATION

OA Seen Propelling Business Productivity 99

COMPUTER INDUSTRY

Pansophic's Rise Spurred by Focus on Goals 101
NCR Unveils Plan to Hire 500 Sales Reps 103
Mass. Bill Would Protect Intangible Material 105
Dealers, Suppliers Contest Terms of Legislation 109
Trilogy Story Shows Risks of Start-Up Efforts 111
Cullinet Shareholders Vote to Change Name 112

ADVERTISING INDEX 150

ADR[®]/IDEAL[™]

puts you in command
of the application backlog

IDEAL is the one system with *everything* you need to break the application backlog. IDEAL, under one interactive workstation environment, combines a relational DBMS, an active data dictionary and a fourth-generation language with facilities for managing the entire application lifecycle.

IDEAL SOLVES THESE PROBLEMS

Large-Scale Applications
Production Applications
Departmental Applications
Application Enhancements
Online Retrieval
Online Transaction Processing
Dialog Management
Batch Reporting
Complex Updates
Design
Coding
Testing & Implementation
Documentation
Project Management

IDEAL is *the* standard in fourth-generation application development systems. Of course, other systems have subsets of these facilities. But why should you settle for anything less than IDEAL?

IDEAL DELIVERS THESE FACILITIES

Panel Definition
Report Definition
Procedure Definition
Application Definition
Data Definition
Intelligent Editors
Split Screen
Online Help
Menus
Commands
Online Checkout,
Compilation,
Execution
Printing Services

IDEAL COMBINES THESE TECHNOLOGIES

Relational DBMS
Non-Procedural
Languages
Active Data Dictionary
Library Management
Structured Design &
Development
Advanced Interactive
Environments



 **APPLIED DATA
RESEARCH**

The one vendor system software solution

Route 206 & Orchard Road, CN-8, Princeton, NJ 08540, (201) 874-9000

Honeywell Caps Realignment of DPS 6 Line

(Continued from Page 1)

sion includes 2M bytes of main memory, expandable to 16M bytes, and three processors — a central processor (CIP) and scientific instruction processor (SIP) — all linked through 32-bit data paths. The basic configuration also includes a high-speed cache memory.

Fully configured, the 6/95 can support as many as 128 communications lines. Equipped with a new disk controller, it also supports up to

three disks in seek mode while reading and writing on a fourth, the company said.

Carrying a \$20,000 price tag, the bare-bones version of the DPS 6/45 is built around the vendor's Micro 6 microprocessor, has 1M byte of internal memory, expandable to 2M bytes, and, like the 6/95, has the CIP. The basic system also features the firm's multiple device controller (MDC-III), with a panel-mounted 5¼-in. diskette and a communications controller that supports four communica-

HONEYWELL, INC.		
System	DPS 6/96	DPS 6/95
Characteristics		
Relative Performance ¹	38	—
Mips ²	.62	Not Available
Memory Size in Bytes (Minimum-Maximum)	1M-16M	2M-16M
Purchase Price ³ (Memory Size)	\$392,146 (16M)	\$194,000 (16M)
Lease Price (Lease Term)	None	None
Machine Cycle Time (Nsec)	300	300
Channels (Minimum-Maximum)	2-112	4-128
Cache (Buffer) Size	8K	8K
Bus Architecture?	Yes	Yes
Price per 1M Byte Of Main Memory	\$10,000	\$9,000

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equaling 45. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.

2. CW estimates.

3. Includes processor, console and 80M bytes of disk storage.

tions lines.

Users wishing to expand the 6/45's basic configuration can tack on up to four 40M-byte subsystems or four 67M-, 80M- or 256M-byte storage devices. By adding a second controller, the spokesman noted, users can double the system's on-line mass storage, permitting it to support eight storage devices holding 2G bytes of information.

The DPS 6/75's unadorned configuration includes the central processor and CIP, 1M byte of main memory, a memory cache, a multiline communications controller and MDC-III controller. This version lists for \$35,000, exactly half the cost of the company's previous comparable model.

To upgrade the 6/75, users can optionally add an SIP, another 1M byte

of memory and up to 96 communications lines, a spokesman noted.

The 1,200 line/min PRU9620 and the 900 line/min PRU9619 impact line printers both print 136 columns and feature the electronic vertical format unit, which stores user-programmed vertical print formats received from the host system. While the printers are printing, a spokesman explained, software accesses the various formats as required by the user.

Cost of the PRU9619 is \$26,000 and has an annual maintenance fee of \$2,150, while the PRU9620 sells for \$33,000 and costs \$2,900 a year to maintain.

The three DPS computers and the two line printers are available from Honeywell, 200 Smith St., Waltham, Mass. 02154.

Totalcare Customer Service Enhanced by Honeywell

WALTHAM, Mass. — Honeywell, Inc. enhanced its Totalcare customer service program last week with a facility that allows its customers to monitor their own remote systems for software and hardware problems and provides users with error detection and operator assistance.

The Remote Support Facility (RSF) is a standard internal component in all three DPS 6 minicomputers unwrapped by Honeywell last week that allows users greater flexibility in maintaining their systems, the company said.

The RSF also allows Honeywell's Technical Assistance Center (with a user's permission) to take over remote control and operation of a user's system for diagnosis, a spokesman said.

Another enhancement to the Totalcare program is the Remote Support Update Facility, which permits users to update their application programs remotely and also to receive software patches.

Other customer service improvements added to the program include a four-hour and optional two-hour response time on service calls and a 90-day warranty covering both parts and labor. Also, the company said it has reduced its second-shift maintenance charges and eliminated the surcharge on service calls to sites located more than 50 miles from a Honeywell service center.

According to Sy Kraut, vice-president and general manager of Honeywell's Customer Services Division, the added enhancements will improve the availability of the systems to users by making use of the DPS 6 systems' integrated diagnostic abilities.

Another benefit is that customers will also have quicker access to spare parts under the firm's Customer Assisted Maintenance Program. Users subscribing to this program, for example, can request delivery of spare units within four hours if they are located less than 50 miles from an authorized stocking distributor, a spokesman explained.

Four AT&T Digital Services To Be Marketed as Accunet

BEDMINSTER, N.J. — AT&T Communications has announced that four of its digital transmission services will now be marketed as Accunet Digital Services.

Accunet Reserved 1.5 (or 3.0) Service — formerly High Speed Switched Digital Service (HSSDS) — operates at either 1.5M or 3M bit/sec and provides two-way transmission of any signal that can be digitally encoded.

Customers can reserve facilities for applications such as video conferencing, voice, low- and high-speed data, facsimile, graphics and electronic mail. The service can use both satellite and terrestrial circuits, a spokesman said.

Accunet T1.5 — formerly High Capacity Terrestrial Digital Service — can handle the same kind of information as Reserved 1.5 Service and transmits at the same speed, but is a full-time service and operates exclusively over terrestrial facilities.

Switch Bundles

Accunet Packet Service — formerly Basic Packet Switching Service — can switch bundles or packets of data among dispersed customers' computers and computer terminals at either 9.6K or 56K bit/sec, a spokesman said.

Also added to the Accunet family is Dataphone Digital Service, which provides line digital transmission between two or more locations.

Using this service, customers can send data in two directions simultaneously at speeds of 2.4K, 4.8K, 9.6K and 56K bit/sec, according to the Honeywell spokesman.

“A Kodak Komstar 200 microimage processor helped us recap \$3000/mo. in paper alone for our JCL Sysout.”

When a major tire manufacturer needed to handle JCL SYSOUT faster—without enormous labor and paper costs—they turned to Kodak. The Kodak Komstar 200 microimage processor helped make it happen. And first-year savings alone were over half the processor's cost. Find out how a Komstar processor can make jobs faster, easier and less costly. Send in the coupon today. Or call toll-free 1-800-44KODAK (1-800-445-6325), Ext. 301.



Send me the case history above and more information on the Komstar 200 microimage processor.

NAME _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

TELEPHONE (____) _____

Eastman Kodak Company
Business Systems Markets Division
Dept. DP3618, Rochester, NY 14650

For document and text management

Theirs:

STAIRS

Ours:

INQUIRE®

With large volumes of textual material now available in computer-readable form, the indexing, storage, and retrieval of full text has become both an opportunity and a problem for managers of: corporate records, regulatory affairs, corporate libraries, research, and litigation support. IBM has recognized that text management is a critical part of overall information resource management.

They've got the right idea, but the wrong tools.

What about applications which mix text and numbers? How efficient is it to add documents? Can indexing approaches be matched to the application? How flexible is the output formatting?

INQUIRE provides an interactive approach to text management in a single, integrated information resource management system. The INQUIRE thesaurus manager provides vocabulary control and interactive thesaurus-aided retrieval. Users have complete control over output formatting. INQUIRE offers contextual (proximity) searching of text, as well as numeric computation and qualification. And INQUIRE is efficient—no reorganization is needed when documents are added.

One client says it all. "We converted our entire corporate records system from STAIRS to INQUIRE in three weeks, saving \$2,400/month in software costs alone."

We've been helping companies meet complex document and text management challenges

since 1968. If you run MVS, VSI, or VM/CMS, INQUIRE can make text a valuable part of your information resources. Call us toll free today to find out how.

Infodata

Infodata Systems Inc.
5205 Leesburg Pike
Falls Church, Virginia 22041

800-336-4939

In Virginia, call 703-578-3430

Telex: 899-125

Offices in:

Dallas, Houston, Los Angeles, New York, Rochester NY,
Washington DC, Chicago, Tampa, San Francisco,

© 1983 Infodata Systems Inc.

INQUIRE is a registered trademark of
Infodata Systems Inc.

See us at Info '83, NYC Booth 481.

Cincom Systems' Ultra DBMS Out for VAX-11

CINCINNATI — Cincom Systems, Inc. has announced a relational data base management system (DBMS) that runs on Digital Equipment Corp. VAX-11 superminicomputers and was designed for high-volume single

processor or multiprocessor production applications. Called Ultra, the product is also said to include backup and recovery features that offer nearly nonstop operation.

Ultra's Logical User View (LUV)

provides a relational view without requiring knowledge of underlying data structures, a spokesman said. All data base navigation is stored in Ultra's In-Line Directory, requiring the use of four commands to create applications. LUV is also said to provide data structure independence to insulate applications from changes to the data base.

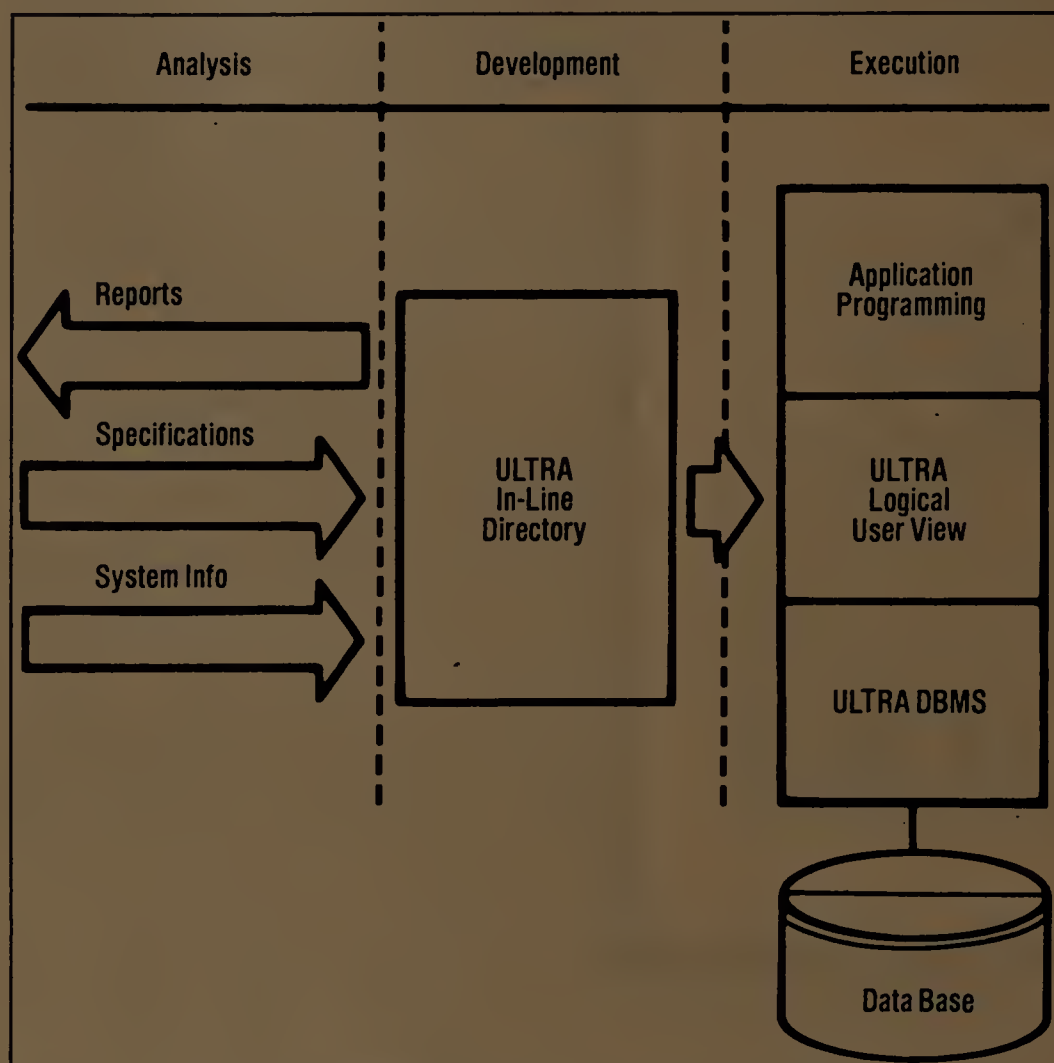
The In-Line Directory provides a single, nonredundant control point for all data. When changes occur, it automatically performs the maintenance necessary to ensure accuracy of data, the spokesman said. It is active during every phase of an application, including execution. All system transactions are monitored and controlled by the directory.

The DBMS uses multitasking techniques and native mode addressing to provide support for numerous ap-

plications running concurrently. Two features are said to provide nearly full-time processing. A virtual accessing method feature is said to meet 80% of all data requirements in memory rather than storage. Task-Level Recovery recovers transaction-oriented data on task bases.

Ultra includes an Intelligent Query and Reporter, an end-user-oriented fourth-generation support tool for ad hoc requests and reports. In addition to reporting, Intelligent Query performs mathematical problems and performs on-line sorting, the spokesman said.

Ultra is available immediately at the following prices per CPU: \$49,400 on the VAX-11/730; \$64,900 on the 11/750; and \$74,900 on the 11/780-782. Cincom is located at 2300 Montana Ave., Cincinnati, Ohio 45211.



Cincom Systems, Inc.'s Ultra In-Line Directory

Cullinet, Apple Halt Plan To Co-Develop Interface

(Continued from Page 1)

product that ran on the Lisa.

"Our feeling was that we would sell the information data base on the mainframe, and we would work with Apple to help it build the software to connect the Lisa," Goldman said, "but all the software on the Lisa would be sold by Apple. We didn't really want to get into that market."

Fielding questions at the Sept. 15 meeting (see story on Page 112), Cullinet Chairman John Cullinane made it clear that Cullinet's stake in the agreement was minimal and that his company was rapidly losing interest. Cullinane indicated that Apple was hedging and did not seem to realize the tremendous benefits to be accrued from such a deal. "If they don't do it, we don't care," he said flatly.

Although Cullinet cited the marketing disagreement as a fundamental difference that engendered the break, Apple saw the status of the agreement somewhat differently.

According to Floyd Kvamme, Apple's executive vice-president of marketing and sales, the agreement has simply been put on the back burner.

"There have been differences on exactly who would do what, but nothing has been canceled, nothing was even signed. It was an agreement to work together," Goldman said.

"We still hope to do it someday," Kvamme said. Once Cullinet develops the capability for the Lisa-mainframe interface, he added, Apple intends to pursue the joint venture.

At the core of the problem may lie a philosophical difference toward integrating personal computers into the mainframe environment.

While conceding that Apple acknowledges the importance of providing micros with access to mainframes, Kvamme said that "fundamentally, Apple is in the personal productivity business."

"The reason I was attracted to the whole Cullinet thing was it was trying to get people access only to the data they really need and want, which made its Information Database a very exciting product,"

Kvamme said.

In spite of the IBM Personal Computer's clear stronghold on the corporate work place, Kvamme said Apple is "fully prepared to compete with the IBM [Personal Computer] from a user-friendly standpoint. We feel we have the better unit for the individual."

Apple Cuts Cost Of Lisa by \$2,000

CUPERTINO, Calif. — Apple Computer, Inc. last week sliced about \$2,000 off the purchase price of its top-of-the-line Lisa microcomputer and unbundled six key software packages developed for the system.

The move brings a basic Lisa configuration into the same price range as IBM's top micro, the Personal Computer XT. Analysts agreed last week that the move is aimed at making the Lisa more attractive to large corporate users.

The Lisa hardware, including the processor, 1M byte of main memory, a 5M-byte Winchester disk drive, two 860K-byte floppy disk drives, a monitor, keyboard and cursor control mouse, now costs \$6,995. A similarly configured IBM XT micro costs slightly more than \$6,000, noted Joe Levy, vice-president of marketing at International Data Corp. (IDC), the Framingham, Mass.-based market research firm.

Six key application programs for the Lisa — Lisawrite, Lisacalc, Lisagraph, Lisaproject, Lisadraw and Lisalist — are now available for \$1,195. The firm also announced a promotional deal that offers the six packages and an Apple dot matrix printer for \$1,495. The Lisa system with the six application packages now costs \$8,190. When it was introduced late last year, the system, including the six applications, cost \$9,995, Apple said.

IDC's Levy said Apple cut the price of the Lisa because the units were not selling at the original \$9,995 price.

LAMOND ON IBM

Los Angeles
November 2-4, 1983

New York
November 8-10, 1983

Fred Lamond, internationally esteemed researcher and strategic-planning authority, thinks and speaks IBM. From the user's perspective. More than 2,500 DP decision makers in 19 cities worldwide have profited from the opportunity to hear his insightful and dispassionate analysis of IBM. And to learn from his extensive expertise.

Lamond's three-day seminar treats strategic planning. New products and policies. Applications. Trends, including the IBM PC. With emphasis on cost-effective alternatives to IBM recommended growth and migration paths. All designed to help you examine options and reduce the cost of doing business with Big Blue.

Phone now for your Seminar prospectus. Dial 1-800-558-5148 (in Wisconsin, 414-355-3405), or write:


CAP GEMINI SOGETI
U.S.A. GROUP

CAP GEMINI SOGETI USA GROUP
9045 North Deerwood Drive, Milwaukee, WI 53223

QUICK!

**Name the fastest
VM dump restore,
and the fastest
VM sort program.**

**(SYBACK & SyncSort CMS.
What took you so long?)**

Call (201) 568-9700.

**Meet our super-
sonic systems.**



syncsort
INC.

If you didn't choose SYBACK and SyncSort CMS as the fastest in their categories, *do not* go directly to jail. But read this very, very carefully.

SYBACK, our fast dump restore for VM systems, and SyncSort CMS, the only high-technology sort for VM/CMS, represent a great technological leap forward. No other programs of their type can provide all three of the following positive advantages:

(1) THE FASTEST VM PERFORMANCE: SYBACK and SyncSort CMS make data move like greased lightning. Compared to their "competitors," these programs can save a tremendous amount of computer resources:

- **50% in Elapsed Time;**
- **45% in VTime;**
- **55% in TTime;**
- **75% in SIOs.**

These savings are the result of our exclusive Fluid Buffering Technique (FBT). First developed in OS and DOS sorting, we've now extended the benefits of FBT to VM backups and sorts.

(2) THE BEST VM PRODUCTIVITY: SYBACK and SyncSort CMS have tremendous operational flexibility and user friendliness. They're rich in features designed to reduce human intervention in backup and sorting:

• **SYBACK**—Automatic backup based on CP directory • Stand-alone restore capability • Incremental backup facility • Catalog of backup operations • Multi-tasking and execution under CMS • Interactive command processing • Standard-label tape support • Callable by user programs • DASD to DASD conversion and copying. Much, much more.

• **SyncSort CMS**—Sorts CMS, SAM (OS or DOS), or VSAM files • Can be invoked from COBOL, PL/1 or BAL programs • Dynamically allocates disk space • Selects relevant records for sorting • Reformats records on output • Performs summaries of designated numeric fields • Produces reports with pagination, headings and dates • Can often produce simple reports in one day rather than, say, five. Much more, too.

(3) THE FINEST TECHNICAL SERVICE: Our Technical Service specialist are experts in their individual fields. You can count on fast, efficient, courteous service in both backup or sorting operations. More than 85% of all user requests for service are resolved within 24 hours.

CAVEAT EMPTOR: As with all performance software programs, the best way to find out what SYBACK and SyncSort CMS can do is to benchmark them yourself against your present programs.

That should help you make up your mind *fast!*

HP's Model 150 Micro Expands Disk Family

By Jeffrey Beeler

CW West Coast Bureau

SUNNYVALE, Calif. — With the introduction of its Model 150 personal computer, Hewlett-Packard Co. (HP) last week expanded its Winchester disk systems family with two additional models and cut the prices

of its 3½-in. microfloppy storage module series.

At the same time, HP also enhanced its personal computer lineup with the addition of four application software packages for word processing, spelling checking, producing financial spreadsheets and creating

data files.

The latest additions to HP's family of personal computer Winchester disk systems include the 5M-byte Model 9133V and the 15M-byte Model 9133XV.

Capable of operating either alone or in combination with a 270K-byte HP 3½-in. microfloppy module, the two Winchester products mark an advance in both price and capacity over the firm's existing disk units. The 9133XV holds 50% more data than the 10M-byte system that was HP's largest Winchester disk offering for personal computer users, according to a company spokesman.

Cost Less

In addition, the 9133V and 9133XV cost up to \$1,400 less than the HP Winchester disk products they replace, the spokesman said.

Occupying 12.8 in. by 11.2 in. of desk space, the 9133XV operates with both the 150 and HP's Series 200 Model 16 personal computers. The same micros also accommodate the 9133V and the 3½-in. microfloppy diskette unit, the source said.

Only the 5M-byte 9133V, however, operates with HP's Series 80 desktop systems and with the company's business-oriented Model 120 and 125 personal computers.

In other disk-related moves, HP has reportedly trimmed the price of its single- and dual-drive 3½-in. microfloppy diskette systems by 25% and 28%, respectively. The single-

drive Model 9121S stores 270K bytes of formatted data, compared with 540K bytes for the dual-drive Model 9121D.

The four additions to HP's family of personal computer application software packages include:

- Perfect Writer, a word processing system that reportedly permits the concurrent editing of up to seven documents and provides a split-screen capability for displaying two of the seven simultaneously.

- Perfect Speller, which contains a 50,000-word dictionary for checking spelling.

- Perfect Calc, which supports up to seven concurrent spreadsheets, with any two viewable at the same time.

- Perfect Filer, which aids in the creation of customized data files and provides a forms capability for entering and displaying those files.

The 9133V and 9133XV Winchester disk units, coupled with a 3½-in. microfloppy module, cost \$3,040 and \$3,650, respectively. In the wake of the recent price cuts, the single-drive 3½-in. microfloppy now costs \$900, compared with \$1,270 for its dual-drive counterpart. When ordered as a package with the 150, the four additional Perfect Software programs cost \$995.

More information about HP's price cuts and enhancements can be obtained from the firm's local sales offices. HP is located at 3000 Hanover St., Palo Alto, Calif. 94304.

Michigan Court Upholds Taxable Software Distinction

(Continued from Page 1)

to software, is ultimately passed on to end users.

The Michigan ruling — the third state high court decision on software sales taxes in the past two months [CW, Aug. 22] — could have an impact on similar court cases pending in other states, where users have challenged the practice of taxing custom software. In this regard, the Michigan ruling was termed "extremely significant" by some of those who have battled various state treasury departments for sales tax exemption of custom software.

"The only way to win these cases is to show that we, the custom software vendors, are dealing with people and not machines," said Robert M. Sherin, president of Southern Computing Services, Inc. of Miami and a key witness in the Michigan case. "I believe this same case can be argued correctly in most any state and won. . . . This ruling is just spectacular."

Butted Heads

Sherin, who has butted heads with state tax authorities over the software exemption since 1976, said the services supplied by custom software vendors are comparable to the work of lawyers and accountants, whose services are not taxed.

"We want equal rights with those professionals," Sherin said. "The question of tangibility or intangibility in custom software is mitigated by our personal service."

Ron Palenski, assistant general counsel for the Association of Data Processing Service Organizations,

Inc., said he believes the Michigan ruling represents the first time a state high court has upheld a ruling differentiating between custom and unmodified prewritten software. "This is a distinction that will become more important in other cases," Palenski said.

As Palenski noted, the current year has been marked by a flurry of activity in state legislatures and courtrooms relating to software sales taxes. Prior to 1983, only four states had laws and regulations pertaining to software tangibility. That number has increased to 45, and the number of instances in which the rules are being contested has also increased.

Recent high court rulings in Vermont and Maryland stipulated that sales taxes apply to most prewritten programs, exempting some custom software [CW, Aug. 22]. And in Virginia this month, the state attorney general ruled that municipalities there can tax all computer software as personal property.

Attempts to tax software are directly related to austerity programs at the federal government level. "The federal government has cut financial aid to the states, who see the computer industry as a growing source of future [state] revenues," Palenski said. "The states are plainly divided as to how to apply sales tax laws, however."

Further, as Palenski noted, there is a considerable disparity from state to state in attempts to define custom software definitively. This leaves application of sales tax laws as they apply to software "pretty open to question," Palenski said.

Teach your IBM or Wang to read.

Or your CPT, Exxon, Lanier, NBI or Xerox. The compact Dest WorkLess Station™ lets you enter typewritten pages of different types into your word processor automatically without using the keyboard.

For immediate information and the name of your nearest dealer call Mary Thorpe at (800) 536-7582. In Califor-

nia, call (408) 946-1100. Or fill out and mail this coupon to Dest Corporation, 2380 Benning Drive, San Jose, CA 95131.

The WorkLess Station.
The Dest way to improve word processing.

DEST

My word processor is a _____

NAME _____

COMPANY _____

ADDRESS _____

CITY _____

STATE _____

PHONE _____

DEST and WorkLess Station are trademarks of Dest Corporation.

NOW AVAILABLE UNDER MVS/TSO!

VisiCalc® On 3270's?

If you want complete compatibility with the best selling electronic spreadsheet product for micros, join the ~~27~~ Fortune 500® companies that have already licensed

ExecuCalc™ 38

the best selling spreadsheet product for mainframes running VM/CMS and MVS/TSO.

ExecuCalc provides VisiCalc capability to your entire Information Center community for the cost of one micro. All VisiCalc commands and file formats (VC and DIF) are supported. Full compatibility means minimal retraining. In fact, we're so compatible that you may transfer worksheets back and forth between micros running VisiCalc and your mainframe running ExecuCalc!

Plus: Full screen data entry, variable column widths, help screens, and "virtual" worksheets (999 by 702). Worksheets are stored as CMS or QSAM files, so you can share, print, edit, backup, and interface to other software. Installs in 15 minutes. VisiCalc/ExecuCalc training classes available.

Perpetual license: \$5000 per CPU. 30-day unconditional guarantee.

Parallax

Parallax Systems, Inc.
60 West 9th Street • New York • New York 10011
212-475-4001

VisiCalc® is a registered trademark of VisiCorp. ExecuCalc is a trademark of Parallax Systems, Inc. VisiCorp is in no way associated with Parallax Systems, Inc.

Uses Touch-Activated Display

Model 150 Puts HP Into Mainstream Micro Fray

By **Jeffrey Beeler**
CW West Coast Bureau

SUNNYVALE, Calif. — Hewlett-Packard Co. last week leaped into the thick of the personal computer fray with the introduction of a business microcomputer that uses a touch-activated display screen as its main user interface.

Though hardly HP's first desktop offering for nontechnical commercial users, the Model 150 marks the company's debut in the mainstream of the burgeoning nonscientific personal computer field.

Like the IBM personal computers with which it will compete, the 150 supports Microsoft, Inc.'s MS-DOS operating system and is built around a 16-bit Intel Corp. 8088 microprocessor. But in a basic configuration, the HP machine costs over \$100 less than a comparably equipped IBM system and features an accelerated version of the 8088. With the 150, the microprocessor operates at 8 MHz; with the IBM product, the same component is rated at 5 MHz, a spokesman for HP said.

Sharp Tech Departure

In technology, the 150 marks a sharp departure from the other members of HP's Series 100 personal computer family, which also includes the Models 120 and 125, both 8-bit machines supporting Digital Research, Inc.'s CP/M operating system.

Unlike its two sister products, the 150 allows users to implement commands, select menus and otherwise interact with programs merely by touching the unit's display screen. HP claims to have enhanced existing touch-screen technology by trimming its price to the point where it can be made available with the company's latest personal computer as a standard feature.

The Model 150 will also support a much wider selection of industry-standard application packages than either the 120 or 125. Among the programs that operate with the latest HP personal computer are Condor Computer Corp.'s Condor relational data base management system, Micropro International Corp.'s Wordstar word processing system and Visicorp's Visicalc financial spreadsheet facility.

All three packages have been rewritten from scratch — under license from their respective developers — to support the 150's touch-screen and soft-key features, the spokesman said.

Additional Software

Other software available with the 150 includes:

- Personal Applications Manager, a front-end program that buffers users from MS-DOS and allows them to do a variety of tasks without having to enter operating system commands.
- DSN/Link, a communications package that permits data to be exchanged between a 150 and either an HP 3000 series mainframe or other 150s.
- Personal Card File, a simplified data base facility that enables users to create and update an electronic version of a Rolodex-like card file.

- Memo Maker, a simplified, Wordstar-compatible word processing aid that allows users to type, edit and print brief business documents.

- Microsoft Basic, the standard programming language with MS-DOS.

- A graphics capability that permits users to create and print pie, bar, line and other charts without having to enter information through a keyboard.

By the end of the first quarter of 1984, HP will expand the 150's software support to include packages like Lotus Development Corp.'s Lotus 1-2-3, Ashton-Tate's Dbase II and an IBM 3278 emulation feature.

Capable of running all HP 3000 series software without modification, the 150's CPU, display terminal and optional built-in printer sit atop a dual 3½-in. floppy diskette unit that stores 270K byte/drive. Together, the hardware modules occupy about 1.7 sq ft, approximately the same amount of desk space as an open three-ring binder.

A basic 150 comes with 256K bytes of random-access memory, which expands to a maximum of 640K bytes, 10 times the capacity of HP's 120 and 125.

The personal computer also provides an HP interface bus port that permits the attachment of up to 15

peripherals, including optional 5M- or 15M-byte Winchester disk systems. In addition, the 150 sports a low-profile, ergonomic keyboard and incorporates two RS-232 ports, two expansion slots and 160K bytes of read-only memory for storing graphics and terminal features, the source said.

A minimum system costs \$3,995, with an integrated 80-col. printer adding \$500 to the price, and will become available for first customer shipments in October. More information about the 150 can be obtained from local dealers or HP sales offices. HP is located at 3000 Hanover St., Palo Alto, Calif. 94304.

The all-in-one Printer

GP-300L Features

A large variety of font styles, national character sets and custom logotype elements.

Variable size block letters.

Dot graphics

- individual dot control
- multiple dot densities

Multiple bar code symbols and alphanumeric characters

Wide selection of forms handling options

Front Feed: manual single sheet or forms set.

Automatic Single Sheet Handler: automatic dual cassette feeder for sheets and envelopes.

Bidirectional Forms Tractor: continuous forms, both single and multi-part, plus demand documents.



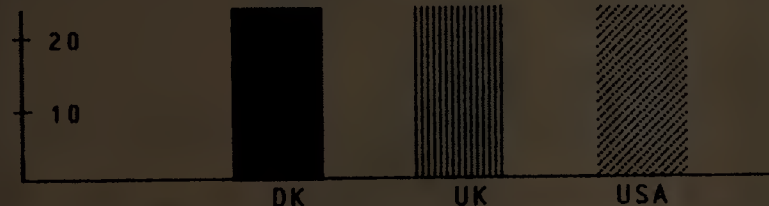
PHILIPS

printed with "Philips GP 300L"

data processing and word processing both in one unit !

Philips GP 300, a speed printer with variable character fonts and pitches

OR DER 1



PRINTER Applications

Eliminates requirement for preprinted forms. Print text, data, bold-face, italics, footnotes, scientific notation and symbols at 10, 12, 15 CPI and proportional. At speeds of 80 to 300 CPS.

Easily read bold headlines and container labels.

Bar graphs, pie charts, histograms, and illustrations printed along with text. Printronix compatible.

Labels for product identification, process control and inventory management.

BDS Corporation
1120 Crane Street
Menlo Park, CA 94025
(415) 326-2115
Australia (03) 241-8901
U.K. (734) 730025

Dealer Inquiries Invited
☐ Please send Information on the Philips GP-300L

Name _____
Title _____
Company _____
Address _____
City _____
State _____ Zip _____
Phone _____



Said to Undercut U.S. Rates

Calif. Users Offered Access to Swedish CPUs

By Robert Batt

CW West Coast Bureau

SAN FRANCISCO — A Swedish company is offering data processing users in California time-sharing facilities on its IBM mainframes near Stockholm at prices which it claims are well below U.S. market rates.

The unique offer was announced last week here by Primdata, a subsidiary of SSAB, Sweden's largest steel company and a specialist in the area of process control, personal computers and communications.

Announcing the proposal at a reception for users, Inger Selinder, Primdata's president, said the idea is to use a combination of communica-

tions technology and time-zone differences to enable West Coast users to reap cheaper data processing services.

Noting that 8 a.m. in California is 5 p.m. in Stockholm, Selinder told his audience, "We believe that time on our side can lead to money on your side. If by taking advantage of this offer you can avoid or postpone investments in mainframes, you can save a lot of money to use in other aspects of your operations."

Under the scheme, the Swedish company, which has opened an office here, intends to make its three computer centers available between 8 a.m. and 8 p.m. Pacific Daylight

Time. The main center at Oxelosund, 80 miles southeast of Stockholm, is equipped with an IBM 3033 mainframe, running under the MVS/SP 1.3 operating system and with Advanced Communication Function (ACF)/Vtvm Version 2 and ACF/Network Control Program/VS communications facilities.

Other Centers

The other two data processing centers are equipped with an AMDahl Corp. 470V/7 and two IBM 4341 systems, respectively. All three centers are tied together using IBM's Systems Network Architecture, Selinder noted. All of the computer

centers, the company stressed, will be manned continuously with two operators, one technician and four systems programmers, who will stand by to assist clients.

California customers will access the computers over a 9,600 bit/sec leased trans-Atlantic line or via satellite. To take advantage of the service, users will need a communications controller — IBM 3705 or equivalent — and Vtvm or Vtvm Version 2 software.

Security of a user's data, company officials asserted, is ensured through the use of a software package called Top Secret, manufactured by CGA Software Products Group in Vandalia, Ohio. The package is purported to be similar to IBM's Resource Access Control Facility.

Although Primdata's computers are located across the Atlantic, there is no difference between the availability of long-leased telephone lines and short ones, according to Bengt Helmersson, the firm's vice-president of operations.

In fact, availability of service at Primdata has been at 99% for the last three years, he claimed, with an average response time of seven seconds and downtime of 25 minutes when stoppages occur.

The risk of the line being unavailable, he said, is very low.

**As a computer professional
your potential for a liability lawsuit
increases with each day's work.**

Along with doctors, lawyers and other professionals, EDP specialists have become everyday targets for major liability lawsuits. These costly and time-consuming actions can result from an actual or alleged error or omission which results in a financial loss to your client.

Now for the good news: Shand, Morahan & Company, the nation's leading underwriting manager of professional liability insurance, offers just the coverage you need to set your mind at ease.

Called EDP Professionals Errors & Omissions, this policy can be carefully custom-tailored to your firm's exact exposures and needs. Whether you're involved in data processing, programming, EDP consulting, systems analysis or software design, this coverage is essential in today's litigious business climate.

The coverage pays defense as well as claim costs. And it can also be extended to include liability protection for other services you provide to clients, such as credit verification, mailing services or management consulting.

Your insurance broker can explain other valuable benefits and aspects of the Shand, Morahan EDP Errors & Omissions policy. Why not call him today?

Primdata Claims 50% User Savings

SAN FRANCISCO — Primdata of Sweden claims users will be able to shave up to 50% off their computer time-sharing bills by using its computers in Sweden rather than those in the U.S. However, final costs are dependent on telecommunications charges and the amount of data being transmitted.

Primdata customers must pay an annual fee for a certain booked capacity on one lease line. These capacities are defined in terms of the number of terminals connected to the Primdata network, Inger Selinder, the firm's president, stated at a press conference held here last week.

Under the terms of the arrangement, the greater the number of terminals used, the cheaper the relative cost. For example, the yearly cost for using between one and 10 terminals is \$33,350; for 11 to 20 terminals, the cost is \$50,000 (a discount of 25%); and for 21 or more terminals, the cost is \$66,700 (a discount of 50%).

Primdata intends to charge \$2.70 per month for each megabyte of storage. On-line transmission costs equal \$3.20 per hour of connect time and \$1.80 per second of CPU time. A discount of 27% is available if yearly costs exceed \$300,000 and 50% for costs in excess of \$400,000.

For batch processing, the company said it will offer its services at 80 cents per second of CPU time and 60 cents per 1,000 execute channel programs. "By allowing us to do batch processing, users will have more time for special in-house services or systems development work," Selinder asserted.

**Shand, Morahan
& Company, Inc.**

One American Plaza, Evanston IL 60201
312/866-2800, Telex 72-4328

Keynoter Calls for Standardization, Cooperation

By Cheryl M. Gelb
CW Staff

PARIS — Pointing to the growing integration of computing and telecommunications, Jacques Stern, chairman of the French National Groupe Bull Co., warned attendees at the opening of the International Federation for Information Processing's Ninth World Computer Congress here last week that they must deal with three obligations:

- Standardization. Interface protection is not essential, according to Stern, who called telecommunications "the hope of the future." Without standardization, "the user may find himself trapped by his supplier and will not be able to take advantage of technological innovation."

- The development of new structures for organizations. Banks, for example, will find that "by modifying their services, they will find themselves modified."

- Cooperation. "Both those who create the technology and those who use the technology must work in concert."

This cooperation is an essential element, Stern said, because anticipation of new services "will be the essential element to ensure corporate success." He urged users to prepare themselves for new technology by anticipating it and added, "it is encouraging to see the impact of users on the design of new products."

Stern's remarks came during the keynote address that opened the triennial congress. After reviewing the progress of computing technology since the 1950s, he predicted that:

- The mean time between failures of a piece of equipment will soon equal the lifetime of that equipment.

- By 1985, 32-bit microcomputers will be common.

Symposium Set For Dec. 12-13 To Cover Nets

SILVER SPRING, Md. — The Computer Networking Symposium, sponsored by the Institute of Electrical and Electronics Engineers Computer Society and the National Bureau of Standards, will be held at the Sheraton Silver Spring Hotel here Dec. 12-13.

A tutorial on computer networks will be presented by Dr. Marshall Abrams on Dec. 12. The keynote address for the symposium will be presented on Dec. 13 by J. Robert Harcharyk, vice-president, MCI Communications Corp.

There will be sessions on network protocols, network engineering, local-area networks, performance analysis, network modeling and mail and file servers.

Prior to Nov. 28, registration fees for members are: computer networks tutorial, \$125; conference, \$50; tutorial and conference, \$175. For non-members, fees are: computer networks tutorial, \$150; conference, \$60; tutorial and conference, \$200. Computer Networking Symposium may be reached through P.O. Box 639, Silver Spring, Md. 20901.

- Gallium arsenide will replace silicon by the end of the decade.

- Rewritable optical disks with a capacity of 10,000 pages, now in the laboratory, will soon be commercially available.

- CRT terminals will continue to be popular — especially with color — but flat-panel displays will come into generalized use.

Stern's enthusiasm came tinged with some hesitancy. "However extraordinary this progress," he said, the need for even greater progress is strong. "Needs grew as computational power increased," he said, noting that "the greater the power at our disposal, the greater the number of insoluble problems we can solve."

The essential dilemma, Stern said,

CW at Ifip '83

is the relationship between performance and requirements. The current progress of computing, for example, will not meet the anticipated needs of industry. Although the CPUs available at the end of the '80s will be able to perform billions of floating-point operations per second (flops), that will be just sufficient.

The people who can resolve this dilemma are the researchers who are grappling with architectures capable of 10G flops. These researchers "hold in their hands the success of tomorrow," Stern said, calling for a much stronger dedication to research.

Despite the progress that may be made in hardware, however, the biggest challenge is software, which Stern said is still in a state of "prehistory" and threatens to strangle the progress of data processing.

The complexity of software today is "unbearable," Stern maintained. Issuing a clear call for simplicity, he urged the development of more generalized data base management systems and called software engineering the most pressing need.

If steps are not immediately taken to rectify the current situation, Stern said, he is afraid "that we will be creating tomorrow the software for the machines of yesterday."

Keep IBM's Best Technical Talent In Sight with SRA Video Updates

When hardware and software changes demand up-to-date technical information, make sure that IBM's technical expertise is on site and in sight...when you need it.

IBM's educational subsidiary, SRA, is now offering the expertise of IBM specialists in the TECHNICAL UPDATE SERIES. Each videotape provides the latest information on specific hardware and software issues, including:

- Performance Considerations
- Product Use Planning
- New Release Planning
- Installation Considerations

Save \$400 and be the first to know!

Update tapes can be purchased individually for \$100—but there is a better way! The TECHNICAL UPDATE SERIES is now available through a two-

year subscription from SRA. Choose 20 tapes from the update library for \$1600— a \$400 savings.

And you will be one of the first to know about new tapes since all subscription customers will receive announcements directly from SRA.

Act now and receive four additional tapes!

Subscribe before October 31 and you will receive 24 tapes for the regular subscription price of \$1600—an \$800 savings.

The first step to becoming a subscriber is to find out more. Send in the coupon or call SRA today, and we'll send you additional information plus a Subscriber Agreement. Your subscriber agreement must be postmarked no later than October 31, 1983 to receive your four bonus videotapes at no additional charge!

Call SRA for details: 312-984-7121/7110



Science Research Associates, Inc.
Information Systems Education Division
155 North Wacker Drive
Chicago, Illinois 60606

A subsidiary of IBM

Hurry and send me more information so I can subscribe by October 31.

Name _____

Title _____

Company _____

Address _____

City, State, Zip _____

Phone _____

Mail to:



Information Systems Education Division
155 N. Wacker Drive
Chicago, IL 60606

Development of Operative Languages Urged

By Cheryl M. Gelb
CW Staff

PARIS — If we really want man-machine communication to be successful, we should forget about developing natural languages and begin instead to design "operative languages."

That stand was taken here last week by Andre Bisseret of France's prestigious National Institute of Computing and Automation Research (Institut National De Recherche en Informatique et en Automatique). Bisseret delivered a paper on psychology for man-computer cooperation in knowledge processing at the International Federation for Information Processing's Ninth World Computer Congress.

"We are still very far from computers understanding natural language," said Bisseret, who cited a number of psychological experiments to illustrate the problems faced by designers or interactive systems.

For example, "a fundamental human activity consists of categorizing objects, facts, events and so on." A person "tries to regroup objects into categories such that the objects of any given category resemble each other and differ from the objects of other categories," Bisseret said.

Scientists, however, try to "formalize the categorizing processes to obtain the most powerful tools possible" — and their results may be quite different.

Thus, Bisseret concluded later in his presentation, it is not yet possible to take results obtained in a laboratory setting and apply them to real-life situations. He proposed that language communications should be studied under the paradigm of ergo-

CW at Ifip '83

nomics psychology, conducting experiments either in the field or via realistic simulations.

The difference between general psychology and ergonomics psychology, Bisseret explained, is that in the former, the subject of an experiment has to "distinguish between true and false, whereas the latter studies the subject involved in action situations where he can either succeed or fail." Ergonomics psychology focuses on the operator.

Given the problems inherent just

in studying the way man communicates and in trying to duplicate those processes by machine, "man-machine languages still have a long way to go," Bisseret maintained. Even if that goal was attained, the machine would understand language equally as well as man "and be in the same situation as man: with the same advantages, but also the same inconveniences, ambiguities and misunderstandings."

The solution, Bisseret believes, is to abandon research into natural languages and instead work on "restricted natural languages," or operative languages.

"Current observation shows that as soon as a group of people must cooperate to a precise objective, these

people build, often not deliberately ... a particular language necessary for the efficiency of their cooperation," said Bisseret, who cited the "languages" developed by surgical teams, air traffic controllers and pilots and cooks in a restaurant.

"These can be sometimes deliberately formalized in order to be systematically transmitted," he said.

If we persist with research into natural languages, Bisseret said, we will reach a point at which "the machine understands general natural language equally as well as man [and] will experience ... the same inconveniences. Consequently, he forecast, "the machine will need to learn, even to create, operative languages."

DATA GENERAL INTRODUCES THE DESKTOP GENERATION.



IEEE Approves Test Standard

SILVER SPRING, Md. — The Institute of Electrical and Electronics Engineers (IEEE) Computer Society has authorized the development of a standard for software unit testing, which will be the first to specify a software engineering process.

The unit testing standard is being developed by a task group of the Software Engineering Standards Subcommittee. Membership in the group is open to all interested — IEEE membership is not required.

The current draft decomposes unit testing into seven activities:

- Identify the features to be tested.
- Plan the approach, resources and schedule.
- Design the test cases and procedures.
- Implement the design.
- Execute the test procedures.
- Check the results.
- Report the evaluation.

Plans call for the inclusion of detailed examples from commercial, scientific and real-time applications as well as guidelines for implementing the standard.

Further information is available from David Gelperin, 2425 Zealand Ave. N., Golden Valley, Minn. 55427.

Education, Specialized Languages Seen Key Debate Rages Over Ways to Simplify Languages

By Paul Gillin
CW Staff

PARIS — Large-scale programming languages have become too complex and unwieldy to handle the large applications backlog, and steps must be taken to improve them. That was the consensus of three programming language experts who debated the merits of large and small programming languages at a session of the International Federation for Information Processing Conference (Ifip '83) held here last week.

However, the experts disagreed about which methods are the most appropriate to slim down overweight languages, with two arguing

that changes in education were necessary, while a third said the answer lay in greater use of specialized languages.

The distinction between small and large languages is "irrelevant," declared John Barnes, research director of SPL International in the UK. Rather, a "language should do what's wanted, and it seems small programming languages fail" this criterion, he said.

Barnes argued that standardization of a few programming languages should be a top priority for the computing industry. "There are too many languages out there, and they're too easy to create," he said.

CW at Ifip '83

Moreover, he said standards are generally formed after the fact, when the base of users is too large to make standards effective.

Preparation for learning large languages should begin in secondary schools, he said. For nonscientific students, "technical awareness and some lessons in Basic should be taught to make them aware of computers and get them over the fear of Big Brother," he said. For students

who display scientific aptitude, "one ought to embrace a technical knowledge based, perhaps, on set theory and logic," he said. "Perhaps there should be a simple professional-style language based around Pascal. If children set out to learn in four weeks about computer hardware and software, they can do it."

Barnes' view of the importance of large languages was not shared by David May of Inmos Ltd. of the UK. "A language is an important tool of communication from programmers to others, and so it doesn't make sense for it to be complex for anyone other than programmers," he said. "We should design languages for users, not for experts."

The basic flaw of most languages is their attempt to include too many functions, May said. "If a feature is included for every specific application and is appropriate for every specific implementation, it will become very large," he stated.

"Experience is beginning to show that one can get a lot into small languages," including concurrent and sequential processing, data types and modules.

Productivity Gains

May argued that productivity gains will not be achieved by complicating languages, and that small languages usually do not need much more extension than larger ones.

"The correct approach is to design a number of simple, reliable languages with efficient implementations" that perform certain functions well, he argued. In addition, large languages need to be simplified by moving them to higher levels. "Languages should be simple and reliable and effective for different applications," he said. However, the leader of one language development group countered that "large languages are far from the ideal, but can we do much better?"

Remi Bourgonjon, of Philipps Telecommunicatie Industrie in the Netherlands, said large languages are "inherently complex," but small languages "only solve small parts of the problem." Bourgonjon argued that no language can affect the complexity of the problem to be solved. As users of a small language continue to append capabilities to meet complex needs, "it soon becomes a large language," he said.

He called reliability "a function of the skills of the programmer and the environment" and not of the language. "In my opinion, all languages are about the same in this respect," Bourgonjon said. "Small languages do not make solutions easier than the larger ones, and the larger languages have better facilities for handling some kinds of functions."

Rather, he agreed with Barnes that programming education has to begin at the conceptual stage. "We should make the distinction between learning programming as a discipline and learning languages," he said. "The first precedes the second. With good programming discipline as a background, learning a language becomes a smaller problem."

It's the only desktop to give you the world of data processing, integrated office automation, technical and industrial automation and personal automation. All in one box.

THE WIDEST RANGE OF SOFTWARE.

The DESKTOP GENERATION™ runs one of the widest ranges of software available on any desktop.



It's the only desktop to accept the most popular micro-based operating systems (CP/M-86, MS/DOS) as well as Data General's three advanced operating systems.

It's the only desktop to give you all the benefits of CEO™ office automation in one box: a "personal" computer that provides electronic mail, electronic filing, electronic calendaring, and word processing.

The DESKTOP GENERATION allows you to run such operations as drafting, project management or analysis as a technical/scientific workstation.

And it can provide your small business with the data and information processing power you need to help your company grow.

TIES IN WITH SUPERMINIS AND MAINFRAMES.

The DESKTOP GENERATION not only ties in with every Data General 16-bit and 32-bit machine. It also protects your investment by tying in with IBM and industry-standard networks.



RUNS UP TO 4 TERMINALS FROM YOUR DESKTOP.



The DESKTOP GENERATION lets you tie in up to 4 terminals, depending on your application. That means you can customize your computer network to your needs.

And you can add on such peripherals as printers and graphic plotters. Its memory can be expanded up to 2 megabytes, its storage up to 30MB (that's equivalent to 700 Wall Street Journal pages).

THE WIDEST RANGE OF SERVICE OPTIONS.

The DESKTOP GENERATION is the only desktop to offer 16-count 'em, 16-service plans, giving you the widest range of choices to fit your budget and usage needs.

And one of the few desktops to offer an online, dial-in software information service.

CALL NOW.

To get more information on the phenomenal Data General DESKTOP GENERATION, you only have to call this toll-free number: **1-800-554-4343, Operator C1.**

Or send us this coupon today:

Data General, M.S. 600, 4400 Computer Drive, Westboro, MA 01580.

Please send me more information on the DESKTOP GENERATION.

I'm interested in:

- ☐ Industrial Automation ☐ Office Automation ☐ Small Business Systems
☐ Distributed Data Processing ☐ Design and Drafting
☐ Engineering Analysis ☐ Computer-Aided Manufacturing

Name _____ Title _____
Company _____ Telephone _____
Address _____
City _____ State _____ Zip _____

Data General
a Generation ahead.

CEO and DESKTOP GENERATION are trademarks of Data General Corporation. CP/M 86 and MS/DOS are registered trademarks of Digital Research Inc. and Microsoft Corp., respectively. Copyright 1983, © Data General Corporation, Westboro, MA.

Future of Distributed Systems Seen Clouded

By Cheryl M. Gelb
CW Staff

PARIS — A panel here last week during the International Federation for Information Processing's (Ifip) Ninth World Computer Congress brought home the point once again that the future of distributed systems is still clouded.

Dr. David Boggs of Xerox Corp.'s Palo Alto Research Center told a session on trends in distributed systems technology that the workstation/server scenario — in which end users would have individual personal computers, but share servers of expensive hardware devices, like high-quality printers — is the way to go.

But Prof. Roger Needham of Cambridge University's Computer Lab-

CW at Ifip '83

oratory in the UK, while advocating the idea of servers, would provide computing power to end users via banks of processors.

Xerox's Boggs, who worked on many of the components that today make up his firm's commercially available distributed office systems, noted that the motivation behind distributed systems is threefold: first, to make money; second, to increase the productivity of office workers; and third, to give computing power to the people.

"Within the distributed office systems area," Boggs said, "there is a need for two types of machines: workstation and server. To get fast and predictable response, workstations must be dedicated to individual users. These workstations must be low-cost, and to be cheap, they must be simple; to be simple, they must have no options, only a processor and a terminal [bit map display, keyboard and mouse], a network interface and, possibly, a disk."

According to the Boggs' scenario, the ratio of servers to workstations would be about 10:1, "so cost is not as important. What is important," he maintained, "is that it be easy to assemble many server hardware configurations."

Needham agreed with Boggs' scenario, but only to a point. "Although hardware is becoming cheap, it is certainly not free, and alternative approaches should be explored." He proposed providing end users with dedicated workstations that perform "a usefully high proportion" of the users' requirements, but supplementing them with a processor bank "consisting of a number of powerful computers connected to the network-stations by a suitably high-performance network."

A processor bank would give each user the most powerful machine that he might ever need, and it would provide a comfort factor because "really powerful machines are hot and noisy," he maintained.

So far, Needham said, this scenario has been tried on a model basis at Cambridge University. The processor bank consisted of 22 minicomputers, ranging in size from 128K bytes to 2M bytes, that were accessed by terminals and backed by file and tape servers. The experiment has been successful, according to Needham.

The advantages of this approach are threefold, he pointed out: It provides enhancement ease, convenient maintenance and what he termed "graceful obsolescence."

Tech Challenges For System R Cited by Designer

By Cheryl M. Gelb
CW Staff

PARIS — One of the designers and implementers of IBM's System R distributed relational data base management system spoke optimistically here last week of such systems, but warned that four technical challenges still remain to be overcome if distributed data bases are to be truly successful.

The first challenge is to get good performance out of a distributed data base system without compromising its design, Laura M. Haas of IBM's San Jose, Calif., research facility told a session on trends in distributed systems technology. The session took place at the International Federation for Information Processing's (Ifip) Ninth World Computer Congress.

According to Haas, "The design of the distributed data base, in particular the placement, partitioning and replication of data, is very important."

The second challenge is to develop algorithms to deal with partial failures. The major technical reason for implementing a distributed data base, Haas pointed out, is that it provides users with more throughput and greater availability of data. Also, because the data base is distributed, data crashes do not affect all users. When crashes do occur, however, a way must be found to make the affected part of the system operational more quickly, she said.

The two remaining challenges are: ensuring limited access to data and finding effective and complete ways of verifying and debugging.

*Our PasswordTM
Modem's
sophisticated
new
control panel*

THE BUSIER YOU ARE, THE BETTER YOU LIKE IT.

PASSWORDTM is a modem so efficient and convenient there is little to do but turn it on to transmit at 300/1200 baud. Operating features include auto dial/answer, auto mode/speed select, full/half duplex. PASSWORD has all this, plus a two-year limited warranty, at a price of just \$449.*

TELPACTM telecommunications software (optional) programs PASSWORD to transfer files, in terminal or host mode, with multiple error checks. Phone directory gives choice of timed automatic or one-touch dial and logon. Command mode includes file display and update, menus and help, and much more. Write or call for complete specifications.

*Suggested list for PASSWORD complete with power, phone, RS232 interface cables. TELPAC software optional extra, \$79.

PASSWORD, TELPAC, USR logo and U.S. Robotics are trademarks of U.S. Robotics Inc.

3103



U.S. ROBOTICS INC.
1123 WEST WASHINGTON
CHICAGO, ILLINOIS 60607
(312) 733-0497

☐ Tell me more about PASSWORD, TELPAC.

NAME _____
COMPANY _____
ADDRESS _____
CITY/STATE/ZIP _____
TELEPHONE _____

3103

IBM													
System	4331-1	4331-2	4341-9	4341-10	4341-1	4341-11	4341-2	4341-12	4361-4	4361-5	4381-1	4381-2	3083-E
Characteristics													
Relative Performance ¹	18	22	24	34	40	50	66	76	49	66	100	133	185
Mips ²	.26	.38	.40	.58	.72	.88	1.1	1.2	.79	1.14	2.1	2.7	3.1
Memory Size in Bytes (Minimum-Maximum)	1M-4M	1M-4M	1M-4M	2M-4M	2M-4M	2M-8M	2M-16M	2M-16M	2M-12M	2M-12M	4M-16M	4M-16M	8M-16M
Purchase Price ³ (Memory Size)	\$112,420 (1M)	\$112,500 (1M)	\$81,000 (1M)	\$170,000 (2M)	\$205,000 (4M)	\$240,000 (2M)	\$350,000 (4M)	\$500,000 (2M)	\$150,000 (2M)	\$200,000 (2M)	\$370,000 (4M)	\$500,000 (4M)	\$1,200,000 (8M)
Lease Price (Lease Term)	\$5,830 (2 Year)	\$6,765 (2 Year)	\$5,400 (2 Year)	\$8,890 (2 Year)	\$8,940 (2 Year)	\$1,160 (2 Year)	\$14,490 (2 Year)	\$21,650 (2 Year)	\$2,850 (5 Year)	\$3,800 (5 Year)	\$7,030 (5 Year)	\$9,500 (5 Year)	\$37,400 (4 Year)
Machine Cycle Time (Nsec)	900 (Per 4 Bytes)	900 (Per 4 Bytes)	150-300	150-300	150-300	120-240	120-240	115-230	100 (Per 4 Bytes)	100 (Per 4 Bytes)	68 (Per 4 Bytes)	68 (Per 4 Bytes)	26
Channels (Minimum-Maximum)	0-2	0-2	3-6	3-6	3-6	6	6	6	1-4	3-6	6-12	6-12	8-16
Cache (Buffer) Size	8K	8K	2K	8K	8K	8K	16K	16K	8K	16K	8K	32K	Not Available
Bus Architecture?	No	No	No	No	No	No	No	No	Yes	Yes	No	No	No
Price per 1M Byte Of Main Memory	\$15,000	\$15,000	\$15,000	\$15,000	\$15,000	\$15,000	\$15,000	\$15,000	\$7,500	\$7,500	\$10,000	\$10,000	\$25,000
1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equating 45. These numbers are designed to put the pro- cessor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and archi- tectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, per- ipherals and software. 2. CW estimates. 3. For the processor only.													

IBM's 4381 Slams Marketing Window on PCMs

(Continued from Page 1)

tively priced MVS/XA-compatible system that will lure customers over to the MVS/XA environment at a faster pace. Previously, customers that wanted MVS/XA had to spend

\$920,000, compared with the \$500,000 to \$600,000 price range of the 4381.

"An XA entry at \$600,000 will be a very powerful weapon against the plug compatibles. [IBM] hit them

with both barrels," remarked Steve McClellan, vice-president for Salomon Brothers, Inc., a market research firm.

The compatible makers most affected by the 4381 are IPL Systems, Inc. and National Advanced Systems, Inc. (NAS), both of which do not have versions of MVS/XA running on their systems. Seeing the silver lining in the cloud, however, both companies said the 4381 will serve to boost rather than stagnate sales of their systems.

Bill Manser, vice-president of sales for IPL, is confident the Glendale announcement will encourage IPL sales to users that put off buying decisions because the 4381 was an unknown quantity. Now that they know what the 4381 looks like, they will have to make a decision one way or another. Manser feels that the advantages of the IPL systems, coupled with the shortcomings of the IBM product, will allow IPL to pick up more than its share of these users.

would be available.

Dave Goldsmith, communications manager for NAS, said IBM's entry will also boost his firm's sales because it will legitimize the market. "Everyone knew there was a gap, but people don't necessarily wait for IBM to get a gap-filler processor. Rather, what [IBM's entry] does is put IBM's stamp of approval on the fact that the gap existed and now makes all of the systems that compete in that arena credible," Goldsmith said.

The 4361 will place pressure on the 32-bit entries of Digital Equipment Corp., Data General Corp. and Prime Computer, Inc. entered in the scientific market. This marks the first time IBM has focused one of its systems specifically at the 32-bit scientific market.

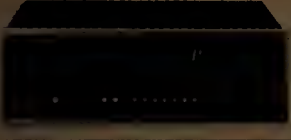
Considering previous 4300 machines, which he considers to be inferior to competing machines on a price/performance basis, Frank Gens, senior analyst for The Yankee Group in Boston, said the 4361 will do well in this market.

"One of the things you have to look at is that IBM, with fairly mediocre products [earlier 4300s] still managed to become No. 2 in the [computer-aided design] market. So what can we expect once they start marketing a competitive product such as the 4361 in that arena," Gens said.

Make your non-IBM world IBM compatible. We have a protocol converter for any situation.



PCI 1076
Get ASCII to SNA/SDLC 3270 emulation with money to spare. The 1076 makes ASCII CRT's appear as 3278's to SNA/SDLC hosts. Personal computers can function as 3278's; attached printers look like 3287's.



PCI 1067
An SNA/SDLC to ASCII converter for 3767 emulation. An alternative to Network Terminal Operator, the 1067 is all that's needed; it's the "Catch All" for ASCII to SNA/SDLC.



PCI 1071
A BSC to ASCII protocol converter for 3271 emulation. It's designed for companies with Bisync who want to use ASCII devices in their networks now, but may want to upgrade to SNA/SDLC later.



PCI 71B/SNA
A BSC 3271 to SNA/SDLC converter for 3274 emulation. It eliminates the need to buy new SNA/SDLC CRT's or controllers, thereby giving new life to Bisync investments.



PCI 1051
An ASCII to Sys 34/38 protocol converter. Expanding the System 34/38 terminal network used to be an expensive proposition. Not now, with the help of the 1051.



PCI 73SX
Converts SNA/SDLC into the X.25 protocol.



PCI 1076X
The remote controller that completes the link for ASCII to SNA/SDLC through X.25.



PCI 75B/SNA
A BSC 3275 to SNA/SDLC converter for 3276 emulation. It eliminates the need to buy new SNA/SDLC CRT's or controllers, thereby giving new life to Bisync investments.



PCI 1051X
ASCII to System 34/38 through X.25 packet network.

And we'll help you save time and money, too.



NEWCORP PRODUCTS INC.
45 COMMERCE DRIVE
ASTON PENNSYLVANIA 19014

800-345-8278

IN PENNSYLVANIA (215) 485-8180



NAS Cuts Prices After 4381 Debut

MOUNTAIN VIEW, Calif. — Reacting to IBM's 4381 introduction, National Advanced Systems, Inc. (NAS) last week slashed prices by 20% on its AS/6600 series of mainframes, which compete against the 4341 and 4381.

Effective immediately, the company also reduced prices on its AS/8000 and AS/9000 series by 10% to 14% in reaction to IBM 3083 price reductions.

In a prepared statement, NAS President Dave Martin said the 4381 announcement will not affect the company's ongoing goal of maintaining a 20% price/performance edge over IBM. "In fact," Martin said, "the [4381] announcement confirms the positioning of our AS/6600 series."

Manser said IPL does not feel any pressure to put MVS/XA up on its system in response to the 4381, pointing out that most of IPL's customers do not need that kind of capability.

"The question I'll be posing to my customers is: 'Do you really need XA?' XA is for the big boys that have a distributed processing kind of network," Manser said. "They [IBM] did the same thing with [Systems Network Architecture/Synchronous Data Link Control (SNA/SDLC)] in the early 1970s; they dangled it before them, telling them they have to go with SNA/SDLC. But 10 years later, less than 10% of their customers have it," he added.

While he downplayed the strategic importance of the 4381's MVS/XA compatibility, Manser also said the company plans to have an MVS/XA-compatible offering, but declined to say when such a system

Supercomputers Seen Gaining in Corporate Use

By Tom Henkel
CW Staff

CAMBRIDGE, Mass. — Large-scale, number-crunching computer systems will soon become as essential to business as commercial mainframe systems, according to several experts in the supercomputer arena.

Speaking at the Supercomputers Conference here sponsored by the Education Foundation of the Data Processing Management Association, the expert observers agreed supercomputers are going to take on greater importance in corporate environments as the demand grows for bigger and faster computers.

A lack of specialized software and the stigma that supercomputers are difficult to use have helped keep the

multimillion-dollar number crunchers out of corporate environments, noted Dr. Sidney Fernbach, the former head of computation at Lawrence Livermore National Laboratories and currently a private consultant.

"People are scared of supercomputers because there is no easy way of getting to them," Fernbach said. Dr. Paul Schneck, assistant director for computer and information science at the National Aeronautics and Space Administration's (Nasa) Goddard Space Flight Center, supported Fernbach's contention, adding that most supercomputers in use by government agencies are "sequestered" for classified applications. With many users currently demanding

more performance from commercial processors, Fernbach said the basic principles of supercomputing, such as vector processing, will have to be embodied into corporate environments to meet the demand for processing power.

Artificial intelligence software and advanced technologies, such as vision systems and computers that respond to voice commands, require massive overhead just to support the system resources, let alone added applications. Such systems will require larger, faster processors, noted Commander Ronald Ohlander, program manager of the government's Defense Advanced Research Projects Agency (Darpa) Information Processing Techniques Office.

Ohlander, however, explained that while the current term "supercomputer" generally refers to a large-scale, number-crunching processor, this type processor is only one player in the future of computing.

"The goal is to develop a system which provides intelligence to assist the user in managing large stores of information." That system, Ohlander said, will probably support a symbolic rather than numeric architecture and will be able to support artificial intelligence applications as well as complex communications networks.

Finding the skilled systems developers to create such a system may be a problem, according to another technical specialist.

"We are not producing a sufficient number of technical personnel to meet the needs of the information processing industry," noted Dr. E.F. Infante, director of the Mathematics and Computer Science Divisions of the National Science Foundation.

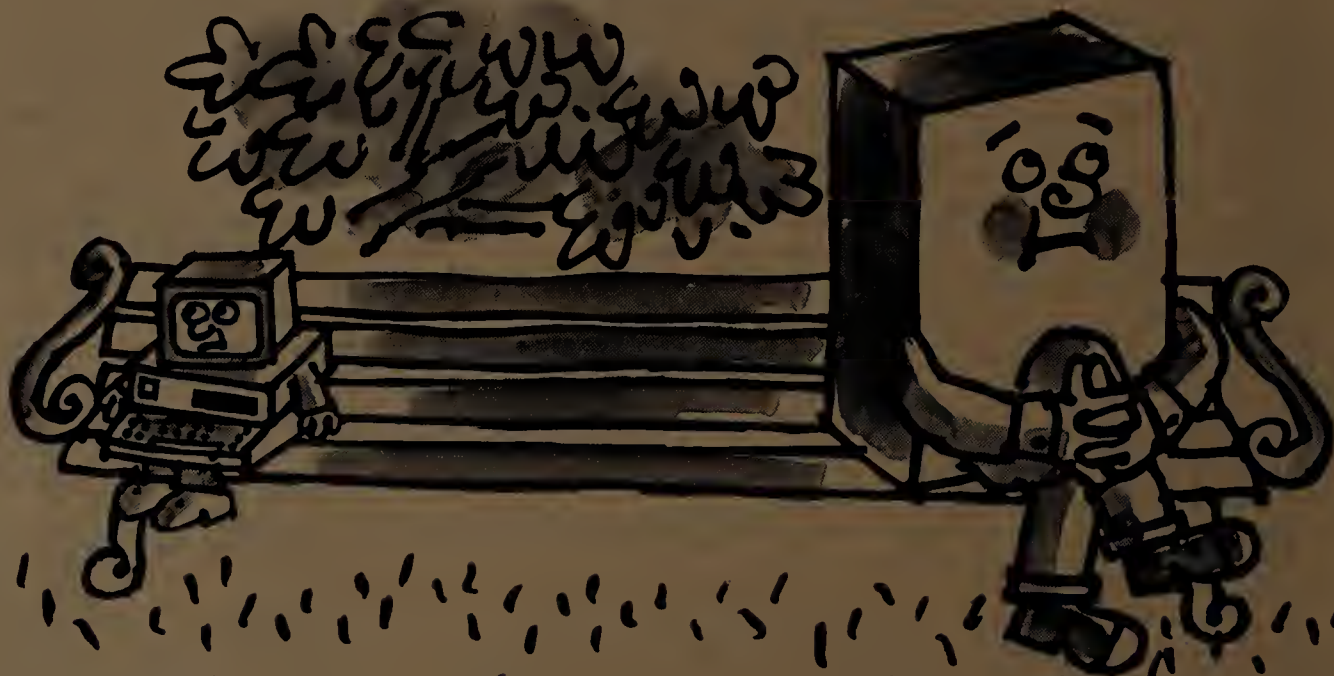
Infante noted that it is very difficult for academicians to gain access to large-scale processors, such as those of Cray Research, Inc. or Control Data Corp., because the competition is very high for the few government systems open for public research.

"Right now, the best scientists don't necessarily have access to supercomputers. Those who are successful are just more aggressive," Infante said, recommending that the government set up a referee committee to determine which academic research projects can be allowed to use government supercomputers.

He noted, however, that three universities (Colorado State University, the University of Michigan and Purdue University) have installed supercomputers for research. Unlike the government supercomputers that are 100% saturated with users, the university systems are only about 20% to 30% saturated.

This, Infante said, is because the universities charge high user fees for access to the processors. And the university supercomputer usage fees typically cannot be bundled into a regular project budget. For example, the University of Minnesota, which has a Cray 1, charges \$2,000 per hour for nonprofit use and university research. It charges \$3,000 per hour for all other use. When researchers have to pay "cold cash" for system resources, the desire to use them drops dramatically, Infante said.

Now your IBM/PCs and mainframe can share information with each other.



Just share a little information with us.

OMNILINK software gives your IBM/PCs and mainframe an open channel of communications. So you can use your personal computers to get information from your mainframe or any other IBM/PC connected to your CICS system. OMNILINK lets you make decisions based upon more complete, up-to-date data. You can also use OMNILINK to send and receive all your messages, documents, and batch reports via your existing terminals, word processors or IBM/PCs.

To let you manipulate information on your PC, we've included a copy of OMNIMICRO software.

OMNILINK

Name _____ Title _____
Company _____ Phone _____
Address _____
City _____ State _____ Zip _____

**ON-LINE
SOFTWARE
INTERNATIONAL**

Fort Lee Executive Park
Two Executive Drive, Fort Lee, NJ 07024
CWLCS3 (201) 592-0009, Toll Free (800) 526-0272

OMNIMICRO dramatically increases your IBM/PCs' capabilities. It lets you write your own programs on your PC using a simple non-technical language. You can also make queries in plain English. Just key in the information and format you want. OMNIMICRO will search the mainframe or other PCs and deliver the data to your PC. OMNIMICRO even gives PC users integrated word processing, spread-

sheet and graphics capabilities.

To learn more about how your IBM/PCs and mainframe can share information with each other, share a few facts with us. Mail in the coupon.

Book Delineates Decision Support

BETHESDA, Md. — The Urban and Regional Information Systems Association (Urisa) has published a 500-page book on decision support systems for policy and management.

The book contains 42 papers on the design and application of computerized information systems to serve public decision making.

The book costs \$28, including postage and handling. Payment is required prior to shipment. Further information is available from Urisa, 4720 Montgomery Lane, Bethesda, Md. 20814.

U.S. Supercomputer Support Crucial, Committee Declares

By Tom Henkel
CW Staff

CAMBRIDGE, Mass. — If a government committee formed to study foreign threats to U.S. technological supremacy gets its way, stronger financial support for the U.S. supercomputer industry and its related disciplines, may become an official policy.

Dr. James F. Decker, chairman of that committee — the Federal Coordination Committee on Science and Engineering Technology (FCCSET) — and special assistant to the director of the Office of Energy Research at the U.S. Department of Energy, told attendees at a conference on supercomputers here last week that the government should become a "friendly buyer" of supercomputers, related high-speed peripherals and software. The conference was sponsored by the Education Foundation of the Data Processing Management Association.

The government should guarantee that it will buy supercomputer hardware and software from U.S. vendors in efforts to bolster corporate research and development projects, Decker maintained, emphasizing that the government should steer clear of manufacturing its own supercomputing gear.

The FCCSET task force recently submitted its recommendations for maintaining U.S. technological dominance, Decker said. With the 1990 goal of developing a large-scale scientific processor 200 times more powerful than current supercomputers, Decker recommended that the government significantly up-

grade its plans to purchase large-scale scientific processors, even if those processors are still in the prototype stage. In addition, he said the government should consider offering research and development tax incentives to industry and be more generous in funding long-range, experimental software and hardware development projects. These steps, Decker said, will help keep the U.S. supercomputer industry healthy.

Noting that only one of the three major supercomputer manufacturers (Control Data Corp., Cray Research, Inc. and Denelcor) actually manufactures peripherals, Decker said the government must also make a strong commitment to bolster U.S. research into development of high-speed peripherals to support a 200-fold processor performance improvement.

Since most government-owned supercomputers are used for classified applications, Decker explained there have been relatively few people trained to use supercomputers, and consequently there has been little software developed specifically for large scientific number-crunching processors. To solve this problem, Decker recommended that the government attempt to make more time available on its nonclassified supercomputers to academic research and development. Decker explained this move would help develop more supercomputer applications, and it would help train more researchers in the use of supercomputers.

Lastly, Decker recommended the U.S. set up a permanent interagency group to coordinate industry and government large systems activities.

Japan's Technopark Seen Sparking High Tech Interest

TOKYO — To spark interest in science and technology, a group of Japanese scientists has mapped plans for an \$800 million, Disneyland-like complex here.

To be known as Technopark, the complex will include five museums highlighting the evolution of industrial technology and will be located in a 500-acre park.

Plans for Technopark were drafted following two years of study by the Technopark Concept Study Committee of the Japan Science and Technology Foundation. Designers hope Technopark will instill an appreciation of the history of technology and help visitors envision the high technology world of tomorrow.

According to the Technopark Study Committee, developers and the local government here will cooperate with financiers and leaders in the machinery, electrical and chemical industries in the design and construction of the park. The Ministry of International Trade and Industry has expressed considerable interest in the project as a means of promoting "creative basic technology" in Japan.

The museums, which will feature actual plants and model displays allowing visitors to get hands-on experience, will chart the growth of tech-

nology from ancient times to the present. The study committee decided upon a park format for the complex in order to promote understanding of industrial technology in a natural setting, a spokesman said.

Videotape Series Offers Training To Unix Users

ARLINGTON HEIGHTS, Ill. — Advanced Systems, Inc. is offering a series of videotape training courses for the Unix operating system.

The first two courses in the series — an overview of the system and a discussion of its fundamentals — consist of 21 taped instructional units and are available now. The third course, available in October, will cover the C programming language.

Future course topics include Shell programming language, advanced Unix commands and C applications. Developed by Chicago-based Telemedia, Inc., the courses can be leased for between \$50 and \$100 per unit from Advanced Systems at 2340 S. Arlington Heights Road, Arlington Heights, Ill. 60005.



SO YOUR HEAVENLY HOST HEARS BISYNC 3780 AND YOUR PC'S WANT TO TALK TO IT?

Now, from the company that gave IBM its bisync 3270 emulator comes the BIS-3780® Emulator for RJE and datafile transfer.

With personal computers popping up everywhere, you need the most powerful and efficient communications link available to provide accurate and reliable data transmission. The BIS-3780 from Micro-Integration, Inc. is the product to meet your needs.

Micro-Integration is not only committed to providing high quality communications products, we have had years of experience at it, too. We authored the bisync 3270 emulator marketed by IBM for its personal computers. And, together with IE Systems, Inc., we offer a full range of other async and bisync software for 8 and 16 bit micros. SNA/SDLC software has completed final beta test.

The current version of BIS-3780 Emulator is our latest advance in communications software, enabling your systems to transmit the largest blocks of data as data files.

FEATURES

- Full function 2780/3780 Emulator on point-to-point or dedicated lines -
- PC-DOS, MS-DOS, CP/M and CP/M-86 versions on 8080, 8085, Z80, 8086 and 8088 micros
- Host to PC, PC to Host, PC to PC transmission and reception
- RJE Control Support for HASP and POWER command entry for status and control of remote jobs
- Sends and receives text and binary files
- Hardware Diagnostics
- Error Checking
- EBCDIC/ASCII Translation
- Allows mixed batch streams of JCL and Data Files
- Time-tested and well-proven with thousands installed since introduction in 1980

FOR THE BIS-3780 PRODUCT BULLETIN AND PRICE LIST, CONTACT OUR EXCLUSIVE NORTH AMERICAN SALES REPRESENTATIVES: IE SYSTEMS INC. BOX 359, 112 MAIN STREET, NEWMARKET, NH 03857 603-659-5891

BIS-3780 is a registered trademark of Micro-Integration, Inc.; IBM and PC-DOS are registered trademarks of International Business Machines Corp.; MS-DOS is a registered trademark of Microsoft Corp.; CP/M and CP/M-86 are registered trademarks of Digital Research, Inc.; Z is a trademark of Zilog, Inc.

Yes, I want to talk to my Heavenly Host.
Please send me additional information on the BIS-3780 Emulator.
Name _____ Title _____
Organization _____
Address _____
City _____ State _____ Zip _____
Phone _____
My host is _____ and PC's are _____



Information Engineering at its best.

IE Systems Inc.
Box 359 — 112 Main Street
Newmarket, N.H. 03857

International Report

FROM THE CW INTERNATIONAL NEWS NETWORK

AUSTRALIA

HOME BUSH — Facom Australia Ltd., a subsidiary of Fujitsu Ltd., beat IBM, Burroughs Corp. and ICL in a bid for Arnotts Ltd. network of standardized computer mainframes. Arnotts is a large food packaging and engineering firm spanning six states here.

BRAZIL

SAO PAULO — Computer manufacturers here are not worried about the resignation of Carlos Lagoni from his position as president of the Brazilian Central Bank. The bank, under Langoni, has been controlling credit in the country to protect resi-

dent vendors and ward off foreign competition. But sources report that Brazilian businessmen have said they will resort to any upcoming credit changes or import restrictions by illegally obtaining needed equipment, smuggling and using black market money.

CHINA

BEIJING — Stimulated by the government's drive to modernize, China has installed some \$500 million worth of computer equipment, purchased largely from U.S. vendors. In addition, during the first half of 1983, orders were placed for 10 IBM 4300 series mainframes and seven Hitachi Ltd. M series, valued at over

\$20 million. If the momentum of importing computer technology continues, industry sources here predict China will purchase \$200 million worth of high-technology products this year.

BEIJING — Apple Computer, Inc.'s Apple II and Apple II+ microcomputers are gaining popularity in China. While still trailing behind Cromemco, Inc. and Radio Shack, thousands of Apples are reportedly being ordered from Apple's manufacturing plant in nearby Hong Kong.

BEIJING — Hewlett-Packard Co. plans to hold its next board meeting

here in October. The meeting marks the first time an American firm has assembled for a business meeting in the People's Republic since the Communist Revolution in 1948. HP hopes the board meeting will heighten its profile in China.

FRANCE

PARIS — France's Minister of Trade and Tourism traveled to New York recently in an effort to boost France's exportation of telecommunications and electronic equipment.

Minister Edith Cresson lead a delegation of some 250 French business representatives who are striving to increase exports and decrease France's negative trade balance with the U.S. During the press event, Jacques Dillard, director of the Compagnie Generale d'Electricite, said France's electronics industry is among the world's most formidable and is prepared to export telecommunications equipment, hydroelectric power stations, self-propelled electric rail cars, terminals and components for undersea cable systems, batteries for aircraft, office automation equipment and 800 kV circuit breakers.

PARIS — Telesystems has been awarded a \$250,000 software contract from Videotex Systems Ltd. of Wellington, New Zealand. Telesystems will reportedly develop a new videotex software package based on its existing French Teletel software, which will drive the other company's proposed videotex services.

JAPAN

TOKYO — Shipments of computer terminals and peripherals for general purpose computer systems are predicted to increase in fiscal year 1984, according to the Japan Electronic Industry Development Association (Jeida). Figures from Jeida's 1983 industry census showed a 23.6% jump in revenues and a whopping 78% leap in shipments. The most significant growth has been in floppy disk drives and character display equipment. Jeida is forecasting a similar growth rate for 1984.

TOKYO — Japan System Engineering Corp. has unveiled a Japanese language version of Ashton-Tate's Dbase II for the Japanese IBM Personal Computer. The company is already marketing Dbase II, a data base management system, for Nippon Electric Co.'s NEC PC-9800 16-bit microcomputer. The new product is priced at \$1,200.

HAMAMATSU — Nippon Gakki Co. Ltd., a newcomer to the personal computer market here, has introduced a line of music synthesizer home computers that use Microsoft, Inc.'s standard soft read-only memory cartridge. Nippon Gakki, a division of Yamaha MSX System, is reportedly one of the world's largest manufacturers of musical instruments. The new Music Computer CX-5 and Home Computer AX-501 systems are said to feature FM sound and related musical playing capabilities.

The Digital DFM Intelligent Communications Processor



Introducing computer status for the stat mux.

It's priced* like a stat mux, but that's where comparisons end.

Our new Intelligent Communications Processor is powerful enough to handle network control and management, data control and concentration, and channel switching and contention. All automatically.

Multiple microprocessors make it possible and nobody else makes one like it.

Of course, it's all the stat mux you'll ever need, too. With synchronous and asynchronous support. And internal DMA.

Plus, its modular design makes it easy to upgrade. By you. In the

field. Without recabling. Go from 4 to 16 channels—with and without 4.8K and 9.6K bps modems—by simply sliding in new boards.

Our powerful new Intelligent Communications Processor. Sold and serviced by Digital from one end of your network to the other.

It's the first data communications link that's just as smart as a computer, because it is a computer.

For more detailed information on the Intelligent Communications Processor and the complete Digital line of data communications products, call toll free: 1-800-DIGITAL, Ext. 610, and request Digital's "Guide To Data Communications." When calling please reference code TC.

*Four-channel prices start at just \$2,675. U.S. Dollars only.
© Digital Equipment Corporation 1983



Digital's unique Intelligent Communications Processor lets users upgrade from 4 to 16 channels by simply changing modular boards.

digital

Development Project One Year Old

Swedish Firm Launches Semiconductor Blitz

By Gunnar Ericsson
CW Sweden

STOCKHOLM — Radio Industri Fabrik AB (Rifa) has taken the lead in the production of gallium-arsenide (GaAs) semiconductors here.

A year ago, Rifa formally launched a development project in GaAs technology, and today the firm is ready to produce laser diodes, phototransistors, Fet transistors and photodiodes in quantity. The Swedish Air Force has already placed an order for GaAs electronics for a radar system in its new fighter plane, JAS.

The GaAs components are said to function up to seven times faster than conventional silicon semiconductors, and the amount of information transmitted is appreciably larger, which makes the radar system much more sensitive to weak signals from airborne fighter planes.

But Rifa expects to have an even larger market in various satellite-transmitted television projects located throughout Europe, which are slated to be completed within a few years.

These TV-satellites are going to be equipped with GaAs technology, and the parabolic antennae in the receiving end will use GaAs technology as well, Rifa said. This means that the initial development costs (estimated at \$1.3 million) will be amply recovered.

Rifa was founded during World War II to compensate for the wartime cutoff of imported electronic components. Rifa is now the largest producer of electronic components in Scandinavia, with 2,000 workers scattered throughout Sweden, France and Australia and with gross sales of about \$52 million in 1982. In recent years, the company's strategy has been to specialize in tailor-made solutions for various industrial problems.

Ironically, the Rifa GaAs project was originally lead by a Japanese expert — Dr. Takashi Ishii. Ishii, who had previously worked at Mitsubishi Electric Corp., became fond of Sweden during a stay in 1975 as a visiting scholar.

"We were lucky," says Rifa's president Stig Larsson. "Without the help of Dr. Ishii, we could not have got as far as we did."

Larsson laments the fact that Swe-

Courses Offered Through Micros

NEW YORK — American Management Association (AMA) has announced that it will offer management courses through the use of personal computers and a telecommunications link this fall.

Using the services of Telelearning Systems, Inc. of San Francisco, the network provides the opportunity for the student to interact directly with a live instructor.

In October, five courses for managers, supervisors and administrative support personnel will be available.

The courses will cost \$150 to \$185 from AMA at 135 W. 50th St., New York, N.Y. 10020.

International Report

den's heavy taxes lure many experts away from the Swedish industry. "This is a pervasive problem in Sweden. We cannot offer the same terms of employment like American firms ... because of this, a lot of good people have gone west after salary offers that we cannot compete with. Previously, you had groups of idealistic researchers who considered work the important thing in life. This breed has by now become almost extinct, and all that matters nowadays is a good life-style for the researcher and

his family."

Another big problem for Rifa has been its inability to market itself successfully. The marketing department is now gearing up to counter these charges, according to Larsson. "Companies in need of fast transistors and diodes are not going to escape the fact that Rifa exists. It is not enough to beat the Japanese and the Germans in their own home markets [GaAs technology] — it also takes a perfect marketing organization."

The company has had to apply rig-

orous security arrangements, which is rather unusual in the open atmosphere of Swedish society. But there are probably a lot of people around wanting to take a peek at the developments at Rifa, according to Larsson.

"When you know that not everybody working in the Soviet embassy in Stockholm is exactly a diplomat, we will feel better when our patent applications are granted," said Rifa's marketing director, Lennart Forsberg. "Maybe then we can loosen up on security a bit ... without trumpeting too much what we are doing."

Ericsson is assistant editor at CW Sweden.

DEC				PRIME
	DATA			GENERAL
IBM				WANG
	HP			TANDEM
	PERKIN-ELMER			

Save up to 50% on high-performance line printers for your mini or mainframe with quick delivery

Save thousands on your next printer

Digital Associates Corporation offers you big savings on plug-compatible line printer systems. As America's largest value-added line printer supplier, we have the largest selection and best product support available.

Plug compatibility

We *guarantee* plug compatibility with a broad range of systems. Our full line of controllers/interfaces and communications interfaces assures a match with virtually any system.

The largest selection anywhere

Our huge inventory includes 24 models in Band, ChainTrain, Matrix, Belt, and Daisywheel technologies at speeds up to 2,000 LPM. Delivery is fast, usually in four to six weeks.

Service and support

Our nationwide, centrally dispatched installation/service network is unmatched in the industry. We provide total support with in-house technical personnel, a full line of ribbons, spare parts, special purpose accessories, and a money-saving printer refurbishment service.

Solutions, not just printers

Since 1971, we have provided nearly 5000 unique printer application solutions. Our latest innovation, the Remote Line Printer System, (patent pending) *obsoletes* RS232 for high-speed mini-computer-based remote printing. For service, for support, for accessories, for hard-to-find controllers/interfaces, for specialized systems ... your *single* source for high-performance printers is Digital Associates Corporation, 1039 East Main Street, Stamford, CT 06902, 1-203-327-9210, TWX 710-474-4583.

☐ YES! I'd like to save up to 50% on high-performance printers. Please have a representative contact me right away.

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Telephone _____
(Please fill out and return this coupon to:
Digital Associates, 1039 East Main Street,
Stamford, CT 06902) CW92683

The Printer Source ...

Digital Associates Corporation

better printers at better prices

Schools Not Prepared for Computer Invasion: Study

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. —

Schools, in their headlong rush to obtain computers, generally do little planning, fail to recognize the lack of adequate educational software and too often realize few positive teaching results, according to a new study on high school education in the U.S.

The study, which is from the Carnegie Foundation for the Advancement of Teaching, stated: "Computers are now in. The floppy disk has become the badge of progress. And no school district that wants to be 'with it' can afford not to have at least one computer in each school."

"Educators seem confused about precisely what the new miracle machines will do. But the mood appears to be 'buy now, plan later.'"

The book-length study, titled "High School, A Report on Secondary Education in America," presents a comprehensive plan for U.S. high schools, which includes four main objectives: mastery of English, a core curriculum with a global view, better working conditions for teachers and instilling a sense of community service in students.

Lack of Progress

The report's author, foundation President Ernest L. Boyer, former U.S. commissioner of education, noted the potential of computer technology in education, but decried the lack of progress in applying that technology to the real needs of teachers and students.

"Computer companies are aggressively marketing hardware and even giving sophisticated equipment to the schools while failing to help educate the teachers and failing to prepare first-rate material linked to school curricula or objectives," Boyer wrote.

The point, he said, is that "all too much of today's computer instructional material resembles a book cover without pages."

"The technology is available — and increasingly affordable — but educational content that makes the investment worthwhile is largely lacking."

To improve this situation and fulfill what the foundation called "a moral obligation" on the part of vendors, the study recommended that "every computer firm selling hardware to the schools also establish a special instructional materials fund" to help teachers develop high-quality, school-related programs.

The study also suggested

schools base their purchasing decisions "not only on the quality of the equipment, but also the quality of the instructional material available . . . It is strange that while textbooks are endlessly scrutinized, it seems computer software is virtually ignored."

The study went on to recommend that a national commission that includes classroom teachers be named to

evaluate the quality of current educational software. Also, the study called for federally funded technology resource centers at 10 regional university sites to demonstrate the latest technology.

The lack of planning by schools for computer use is an "essential point," according to the foundation, which concluded that before purchases are made, schools should answer the following

questions: "Why is the equipment being bought?" "How good is the available software?" "What educational objectives will be served?" "Which students will use the new equipment?" "When and why?" and "Are teachers able to fit the technology into their curricula?"

In using computers in schools, the study said, "the first priority is to teach all students about the techno-

logical revolution of which computers are a part." The report said the "current inclination to equate technology with computers" was "disturbing."

Secondly, the study continued, schools should make it possible for students to learn with computers and to use computers in libraries and classrooms for reference and information-gathering activities.

IN-HOUSE
MICROS AND MAINFRAMES

Decision Support, compatible

WORKSTATION Micro W



System W/Micro W – modern analytical tools for the manager, the planner, the analyst.

Here are products that combine the power to meet all your financial planning and reporting needs plus the ease of learning to insure acceptance by both novice and expert users. System W is a full scale software product for IBM mainframes, and its smaller but compatible version, Micro W, can meet the needs of personal computer users.

The result is integrated flexibility in modern tools for use at every decision-making level, for applications spanning the full range of management reporting, statistical analysis, forecasting, modeling and color graphics.

True Distributed Decision Support – make real sense of your micros

System W/Micro W go beyond achieving a mainframe-micro link. Unlike most offerings, Micro W and System W have been designed by the same company. Real absolute upwards compatibility, eliminating the need to retrain users who switch between mainframe and micro. It also permits mainframe data, applications or whole models to be sent back and forth. In addition, mainframe models and reports can be developed on the micro for eventual running on the large computer. This is true "distributed decision support" for increasing user productivity.

Access to Corporate Data

The top priority problem we hear from end users: How do I get to the data I need? The answer lies not only

To Neutralize Automation's Effects

U.S. Urged to Support Job Training Programs

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. —

Concerted federal support for job training programs is necessary to offset the employment dislocation caused by increased automation, a congressional committee was told recently.

In testimony before the Joint Economic Committee

Sept. 16, MIT Professor Harley Shaiken called retraining "a critical priority . . . and an important component of economic growth." He told the committee that "any meaningful training program will of course be expensive. The only course of action more expensive is inaction."

"Adequate training for those individuals who are af-

ected by these far-reaching changes [caused by computer technology] is essential both for a humane transition and productive use of the new technologies," he told the committee, which is holding a series of four hearings on the job training needs of American workers.

Shaiken suggested that the best method "is probably

a direct subsidy to the training institution, particularly when smaller firms are involved. Federal coordination is necessary to ensure that the right jobs and the right number of jobs are targeted." He added that "pretraining — training that takes place before unemployment results in industries that are undergoing major transfor-

mation — is preferable to retraining once unemployment results.

"A real danger, however, is that the long-term unemployed will receive the least adequate training as they lose ties to the industries in which they once worked," he said, adding that "instruction in skills alone does not constitute a meaningful retraining program. An adequate stipend while training takes place and sufficient financial aid to move into a new job are necessary."

Similarly, Dr. Marc Bendick Jr., an economist with the Urban Institute, Washington, D.C., told the committee there is a need for federal initiatives, including "new incentives to raise the overall level of training by American industry."

Initiatives Needed

Also, he said, there should be new initiatives "to teach job-search techniques to dislocated workers, new flexible institutions for short-term assistance to local labor markets in distress . . . reform of certain 'anti-training' provisions of the federal income tax and unemployment insurance program and establishment of a new effort to provide pretraining basic literacy skills to the adult unemployed."

At the same time, Bendick said, there should be renewed investment in existing federal training programs for disadvantaged adults and for young Americans.

In general, he added, "The most fruitful approach to retraining mid-career workers to keep up with changing times is to expand training through employers. Mid-career training is largely a matter for the employed rather than the unemployed, and it is largely a matter of a continuous stream of small-scale training activities rather than of large-scale retooling for an entirely new career."

Sheldon Friedman, research director of the International Union, United Automobile, Aerospace and Agricultural Implement Workers of America (UAW), told the committee that job training should be part of an overall national industrial policy.

"To assure steady economic growth and full employment," Friedman said, "we need a coherent, full employment macro policy, coupled with an industrial policy which includes a system of national planning to manage our resources in a manner that best serves the country's needs."

EM W Software at every level. . . .

**INFORMATION
CENTER**
System W

**CORPORATE
MAINFRAME**
System W



with integrated telecommunications to transport the data, but with mainframe software tools designed to understand data from many sources — general ledger, payroll, and other internal sources as well as external data bases.

With System W Filepower, user access can be permitted (controlled by security provisions) to many data bases, no matter what their formats may be.

The Best of Both Worlds

Whether your company is using only mainframes or if

the micro explosion has hit, with System W/Micro W your company can proceed at any pace from evolutionary to revolutionary by equipping broad user populations with personal analytical tools. System W simplifies complex planning needs and facilitates coping with changing business factors.

System W is software with proven, outstanding advantages. It is offered by Comshare whose acknowledged expertise is based on 17 years of unmatched experience in developing and implementing thousands of software solutions to business problems.

30-day in-house trial. For information, call Shary Price (313) 994-4800, Ext. 327.
Or write Comshare, Decision Support Systems Marketing, P.O. Box 1588, Ann Arbor, MI 48106.

COMSHARE

Decision Support Software for Mainframes and Micros

Study Pinpoints What Makes Managers Effective

PORTLAND, Maine — A two-year study of the makeup of effective DP managers revealed a "core" set of attributes found to characterize all highly effective managers, whether they operate in DP or non-DP envi-

ronments, according to Management Research Group (MRG) here.

"Highly effective managers seem to be taking the view that perhaps their single most important role is to help facilitate the effective and suc-

cessful performance of their subordinates," Thomas M. Rand, MRG president, said. Rather than taking on the responsibility for managing this performance, these managers create a work climate that serves to motivate subordinates. The study found that highly effective managers:

- Define management as the process of achieving results through others. Therefore, to a large extent, a manager's success rests with how effectively he influences the behavior and performance of his subordinates. The study found that highly effective DP managers also try to address interpersonal conflict "squarely and use it constructively." Less successful DP managers tend to be more reclusive, according to the study.

- Were very clear in defining their performance expectations and performance standards for subordinates, resulting in a heavy emphasis on the "communication process."

- Have high standards of excellence for themselves and their subordinates, creating an achievement-oriented climate.

- Balance a concern for excellence and performance and an interest in the welfare and career development of their subordinates.

- Know what is going on with their units by establishing systems that monitor the ongoing performance of subordinates.

- Provide subordinates with feedback based upon previously defined performance expectations.

Certificate Program Boosts Grads' DP Career Prospects

JOHNSTOWN, Pa. — While others worked on their tans or caught up on their reading this summer, 19 graduates here at the University of Pittsburgh at Johnstown (UPJ) used the season to advance their career prospects in the field of applications programming.

The students recently completed an 18-week certificate program offered by the school's Computer Programming Institute (CPI). During the 21-credit summer course, first offered this year, the students received instruction in computer programming concepts and techniques from industry professionals and UPJ's business economics and computer science faculties. The curriculum is based on the Data Processing Management Association's model curriculum for computer information systems education and was designed to prepare students as applications programmers in business and industry, a spokesman said.

The program, which costs about \$3,000 and is limited to about 30 college graduates, centers on daily classroom and laboratory work, in addition to seminars and a team project involving systems design for a major corporation. Through batch processing and time-sharing, students have access to the school's computer center, which operates a Digital Equipment Corp. triprocessor Decsystem-1099 and a dual-processor Decsystem-1099.

Students use a variety of software, Basic, Digital Research, Inc.'s CP/M operating system, Cobol-80, the Condor package from Condor Computer Corp. and data base management systems; students also work on the Apple Computer, Inc. Apple II and Franklin Computer Corp. and DEC microcomputers.

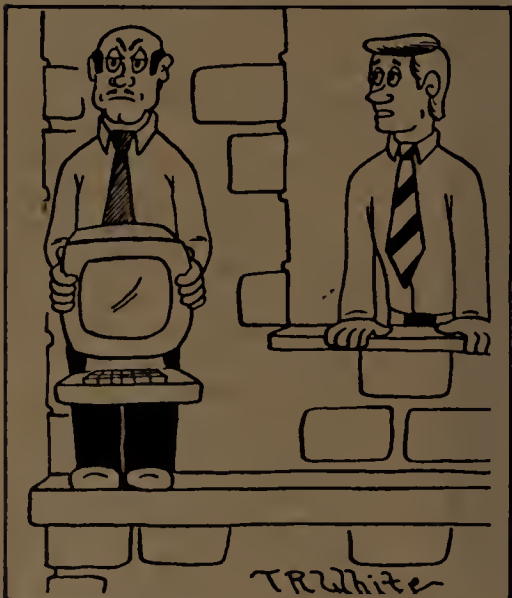
Students in the CPI program are required to write a variety of individual programs in Cobol and Basic and are trained to view software development from a software life cycle per-

spective, the UPJ spokesman said.

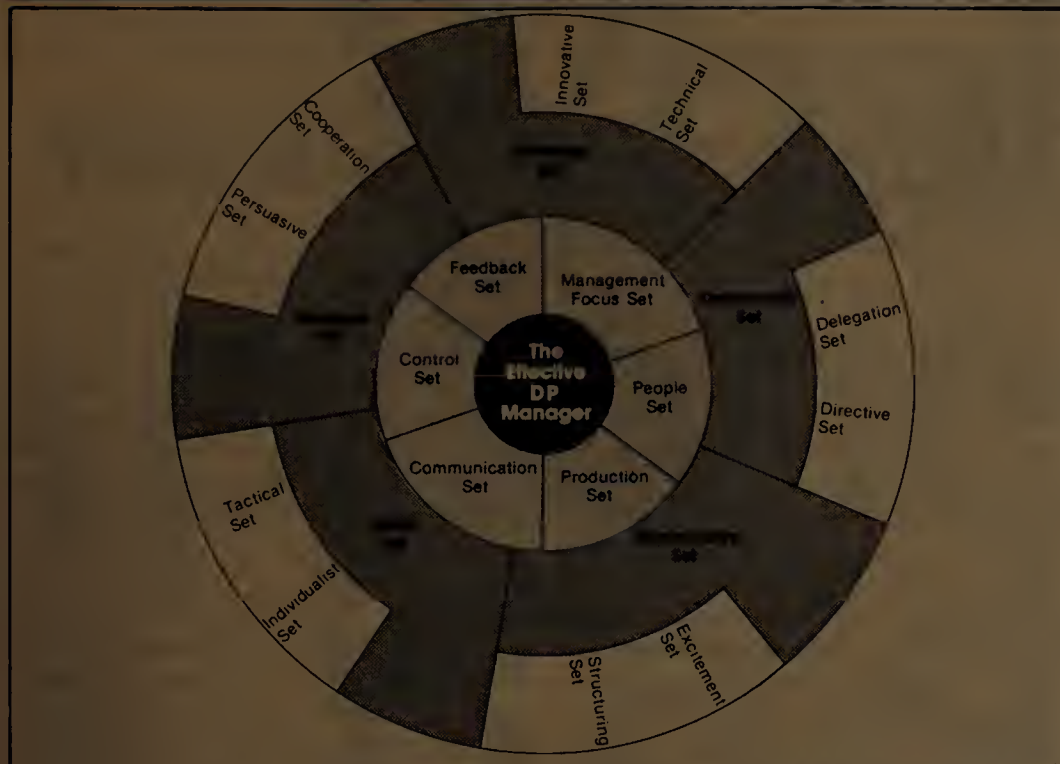
More information about the CPI program, which runs from late April to late August, is available from the Continuing Education Office, 150 Biddle Hall, UPJ, Johnstown, Pa. 15904.

STOP YOUR STRINGING YOU

Lease a Codex Cable Multiplexer
for your IBM 3274 system.
It can link up to 32 terminals
with a single cable.



'I Promise! If You Come Back In, You'll Get Your Own Terminal.'



Factors Relating to Effective Management

Effective DP Managers Seen Nontechnocratic, Flexible

By Patricia Keefe
CW Staff

PORTLAND, Maine — In contrast to the traditional image of isolated technical specialists, effective DP managers are both nontechnocratic and spontaneous in their interpersonal dealings, according to a recent study by the Management Research Group (MRG) here.

MRG is an organization composed of industrial psychologists and data processing professionals that conducts research on factors relating to both managerial and organizational effectiveness. Several hundred data processing managers across the country participated in the firm's

two-year study of the characteristics and attributes of effective DP managers. Also contributing to the study were the immediate subordinates and superiors of these managers who were asked to rate and describe their co-workers.

Effective DP managers share six characteristics critical to all successful managers, according to MRG (see story on Page 22). In addition, a "critically important" result of the study indicated that highly successful DP managers possess five additional attributes that "speak to the complexity of [their] role and also to the unique pressures seen to exist in managing the DP environment," according to MRG President Thomas M. Rand. The specific attributes found to characterize highly effective DP managers include:

- An essentially democratic approach to management, making subordinates feel that they are "part of the action" and that their ideas and opinions are highly valued.
- The creation of a strong team atmosphere where subordinates feel that they are contributing to a group effort and where competition and individual stardom is discouraged.
- A more strategic orientation, resulting in better planning and anticipation of the consequences of their actions and decisions. It follows that highly effective DP managers were found to be "reasonably" future-oriented in that they attempt to predict what will happen and prepare for these situations. Additionally, these DP managers appeared to have a wider perspective on how the organization operates and understood how their efforts contribute to overall organizational effectiveness, the study said.
- A tendency to reject highly conservative thinking and to avoid basing their actions purely upon a status quo position. Not only are they willing to consider doing things differently, but highly effective DP managers "show some degree of intellectual flexibility not seen [in] their less effective counterparts," Rand said.

• Reasonably spontaneous and casual interpersonal dealings with subordinates. These managers do not show the stereotypical description of the reclusive, highly technical "green eyeshade" accountant, the study said. Moreover, highly effective DP managers feel reasonably comfortable dealing with people on nontechnical issues and do not use their technical knowledge as a potential barrier to effective interpersonal relationships, Rand added.

The results of MRG's study have been used to develop the firm's Management Effectiveness Analysis package. Described as a personal diagnostic and development tool designed to help DP managers identify their strengths and weaknesses, feedback from this package focuses on personalized developmental action plans to help each manager improve his overall management effectiveness, according to MRG.

The package is available for \$195 from MRG at 402 Congress St., Portland, Maine 04101.

3274 SYSTEM FROM ALONG.

IBM 3274 system users no longer have to pull individual cables each time they add or relocate terminals.

The Codex Cable Mux provides transparent, high speed communications for up to 32 terminals through one single cable. It saves you money and offers unlimited flexibility in setting up terminal clusters throughout your entire organization.

The Codex Cable Mux also offers a variety of purchase and service options no other vendor can match.

Like the opportunity to lease a unit for as little as \$26 a month.

And a choice of on-site or back-to-the-factory maintenance.

For more information about Codex's Cable Mux, call 1-800-821-7700 ext 888. Or write: Codex Corporation, Dept. 707-88, 20 Cabot Blvd. Mansfield, MA 02048.

codex

 **MOTOROLA INC.**
Information Systems Group

Policies Cover 'Errors and Omissions'

User Suits Give Rise to 'Malpractice' Insurance

By Tom Henkel
CW Staff

Computer-related mistakes cause disruption in many businesses each year. When the mistakes are serious, or the disruption is catastrophic, some firms have resorted to suing the vendors of the products that caused the problems. Convinced that more user-vendor lawsuits are on the way, a handful of insurance companies are offering what amounts to malpractice insurance for vendors of computer-related products.

Technically, anyone who acts negligently in building, selling or programming a computer system can potentially be held liable for financial or physical losses incurred when a computer system does not function properly.

But according to Boston attorney Robert P. Bigelow, relatively few lawsuits result from computer system foul-ups, mainly because negligence is hard to prove. And except for a few cases, most judgments in favor of slighted users have been relatively soft.

Nonetheless, enough vendors and consultants are apparently worried enough about potential lawsuits to carry insurance against the potentially devastating consequences of a large lawsuit.

"Malpractice is a fancy term for a particular kind of negligence," Bigelow said, noting that a computer er-

ror can have a cascading effect on an entire company and possibly the people who buy goods and services from that firm.

Insurance companies call these specialized policies "errors and omissions" or E&O policies. Basically, E&O policies cover the "intangible" losses a user might incur if a vendor's product or service fails, explained Raymond Wahl, vice-president of the National Union Fire Insurance Co. of Pittsburgh, Pa. (the firm is headquartered in New York).

Extra Protection

Most vendors carry general liability policies that protect them against the physical damage caused by their products, but E&O policies provide extra protection for the damage that cannot easily be seen.

For example, a software house might sell a program that not only does not work properly, but also destroys data or damages other programs on the user's system. Wahl said if the user can prove the vendor's product caused extreme damage to his computer system, the vendor may wind up paying fairly high damages, such as the cost incurred in replacing the lost data or rebuilding damaged programs.

Another advantage to vendors is that E&O policies often cover the defendant's legal costs, which can also be high, Wahl added.

The E&O policy can be used by firms other than those whose reason for being is selling computer-related goods and services. For example, Wahl said, many DP departments develop applications packages for in-house use that company officials decide to market to other users. Once the in-house developed program is sold, the originating firm can be held liable for major errors in the code, Wahl said.

With more small businesses turning to minis and microcomputers to manage their financial affairs, Wahl said more user-vendor lawsuits are likely. He noted that the smaller user tends to depend on the claims the vendor makes about a product more heavily than the large users. He added that courts tend to be more sympathetic toward smaller users.

Insurance companies are being selective about the firms to which they will offer E&O policies. "It's probably harder for a one-man shop to get a policy than a 10-man shop," Wahl said, adding that unlike auto policies, insurance companies are free to set premiums on E&O policies to match their risk.

But while insurance companies are willing to offer E&O policies to firms offering DP-related goods and services to end users, they do not appear to be as willing to offer similar policies aimed at protecting DP shops from inadequate employees.

While companies can get insurance to protect them from illegal acts committed by employees, such as electronic theft, insurance companies do not generally offer policies protecting against incompetent DP employees, noted Jeff Isreeli, a vice-president at the New York insurance brokerage firm of Marsh & McLennan Co., Inc.

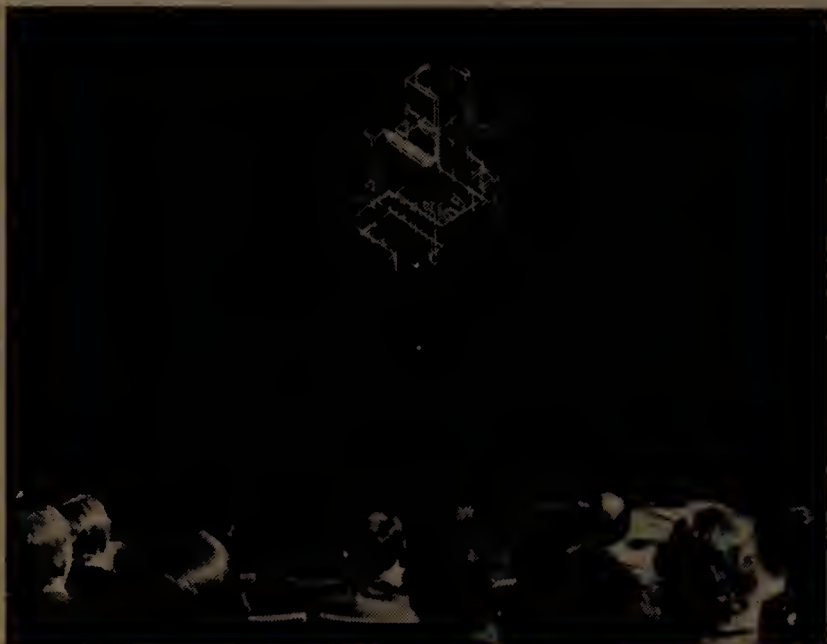
Difficult Task

Noting it is not necessarily impossible for a large firm to have a policy custom-written to meet a specific need, Isreeli "wouldn't be surprised" to see policies offering this type of protection becoming available "in the next year or two." However, defining employee negligence and pinning the blame on a particular segment of the company is often a difficult task, he said.

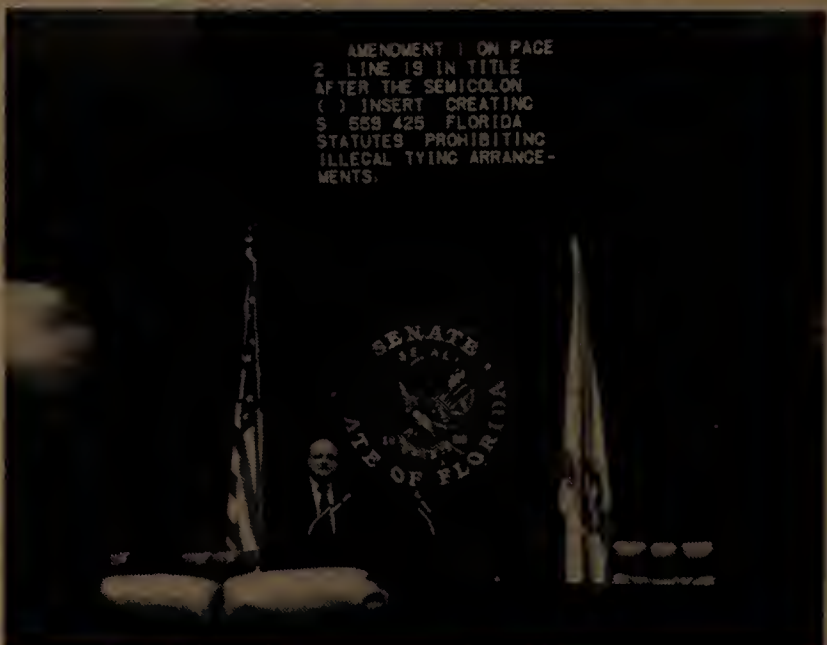
It is possible for an employer to sue an employee for negligence, but "it is extremely rare," Bigelow noted. It is usually easier to simply fire an employee the company feels is incompetent.

Even though a computer system problem can have an impact on the whole company, Bigelow said he does not expect employer-employee suits to become more common.

Such suits tend to be rather expensive, and suing an employee often causes bad labor relations with the rest of the employees, he contended.



COMPUTER-AIDED DESIGN displayed by General Electric projector is viewed by Engineering Society of Detroit.



WORDS "PUNCHED UP" by clerk of Florida State Senate are inspected carefully before a vote.

Invite your computer to meetings with General Electric Professional Large Screen Video Projection

With General Electric's exclusive system for bright, sharp professional-quality pictures, up to 25 feet wide, General Electric Professional Large Screen Video Projectors are making presentations more dramatic, more productive, and more convenient.

Whether videotape, live transmission, TV programming or data direct from your computer, the pictures projected can be seen by everyone in the room, all at once, even when room lighting is provided so viewers can take notes and refer to written material.

The color projectors show every viewer the same accurate color reproduction. An exclusive General Electric system registers the colors for you, eliminating time-consuming manual adjustments.

Portable and flexible, General Electric projectors are being used in a great variety of applications, including both rear and front projection. Ask our applications experts whether yours can be added to the growing list. Call or write: General Electric Company, Projection Display Products Operation, Electronics Park 6-206, Syracuse, NY 13221. Phone: (315) 456-2152. TWX 710-541-0498.

GENERAL  ELECTRIC

What your phones need is a shrink.

They need help, discipline, structure.

And you want control. You want all the information anyone needs to make the phone system run smoothly.

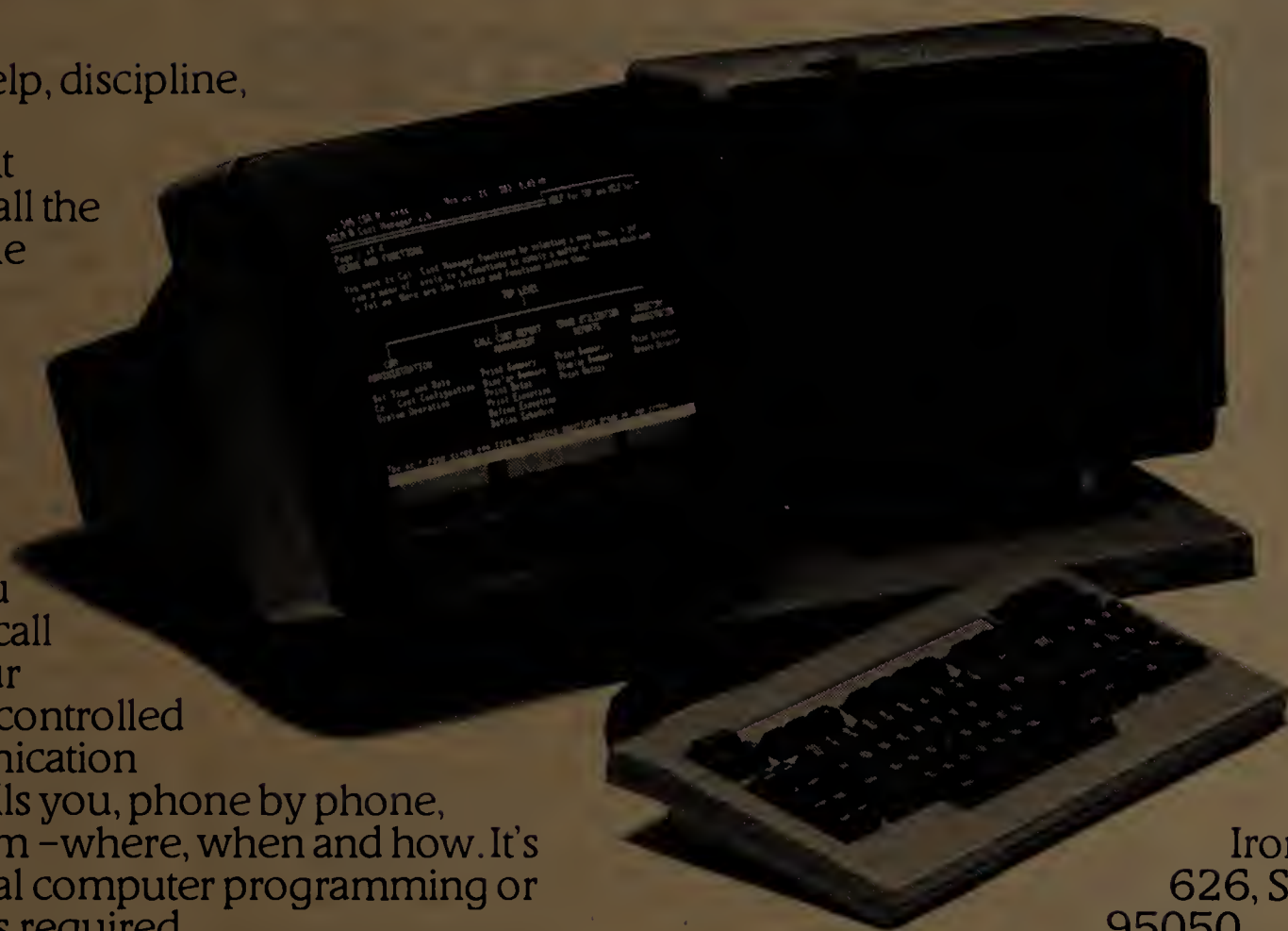
Time to talk to ROLM.

The ROLM® Insite CallCost Manager™ lets you track every single call made through your ROLM Computer-controlled Business Communication System (CBX). It tells you, phone by phone, who's calling whom - where, when and how. It's turn-key. No special computer programming or complex training is required.

CallCost Manager shows where you need reorganization, different schemes of features or lines, or the best way to do extension-by-extension customization.

It actually enhances ROLM CBX features already at work to cut your telephone costs. It tells you your system is placing calls through the least expensive routes. That you have the right trunks for the calls you make. Or if you need fewer (or more) incoming lines, expanded local service, or more specialized - and less expensive - long distance services.

But it's not all detective work. CallCost



Manager does accounting too. Calls are automatically charged to departments, to specific jobs, or to clients - already marked up, if you wish.

To get some Insite into your phone costs, call ROLM at (800) 538-8154. In Alaska, California or Hawaii, call (408) 986-1000, Ext. 3025. Or write:

ROLM, 4900 Old

Ironsides Drive, M/S

626, Santa Clara, CA

95050.

CallCost Manager is only the latest reason why ROLM systems are the choice of the top Fortune companies, and, increasingly, the preferred solution to digital networking. In fact, there are more than 12,000 ROLM CBXs worldwide and over 10,000 data devices communicating through ROLM systems. (That's more than all other PBX manufacturers combined.) And they're doing it now. Not tomorrow. Now.

Talk to us about CallCost Manager. You'll know a lot more about your phones, and your phones will feel a lot better about themselves.

ROLM

ROLM. NOW.

What Do DPs Need for Next Step?

Q My responsibilities include finance, accounting and information services. We have some senior people in information services, but other corporate people, including myself, lack confidence in DPs' management ability and are reluctant to mainstream them into other areas.

I'm going to lose several key people unless I can present them with some career advancement opportunities. Do you have any recommendations?

A I recognize that this is an immediate problem, but it has deep roots, and there is no quick remedy. DP people moving up the ladder sometimes sacrifice man-

agement education to maintain a high level of technical expertise. This is an unfortunate misalignment of priorities.

An expanded set of management skills should be emphasized at each level of increasing responsibility. General education should begin to emphasize management skills after the first promotion.

I would suggest that you modify any existing career development program to emphasize ongoing management education. Given the proper educational environment, an information services manager should be at least as well prepared as managers in other disciplines to move into corporate management.

As for your immediate problem,

confront these people with corporate management's reservations about their ability to take on greater management responsibilities. My guess is that they will agree and be willing to work with you on a program of self-improvement.

Q We anticipate that our very small (one person) computer center will grow to three people by the end of next year. Our expanded responsibilities will eliminate four clerical positions.

All of the people in these positions have expressed an interest in retraining for the two new DP positions. Prior to the announcement of the personnel changes, their interest in DP was lukewarm, at best.

Turnaround Time

By Larry E. Long

I feel an obligation to hire from within if possible. Three years ago, I was a bookkeeper and had no background in DP. My problem: How do I pick which ones to train for the new positions? Is there any way I can determine whether they will be good programmers?

A Logic aptitude tests exist that supposedly test one's ability to become a programmer. However, I don't feel comfortable with these tests. There are just too many exceptions: People who fail dismally may make excellent programmers, and people who achieve high scores may never write a program. These aptitude tests do not reflect the all-important intangibles.

If you can delay the decision for a few months, clear it with your boss, then announce that both of the positions will be filled from these four people.

Encourage them to develop some background in the computer field. Recommend a DP fundamentals course and perhaps a programming course at a local college. Provide some after-hours instruction on equipment operation and specific applications systems, then invite the DP candidates to work with you for a short period each day.

I would anticipate that at least two of them will show a genuine interest in a career change and will make the commitment.

If one or none is willing to retrain, then you may have to recruit people outside the company.

Q I work in a staff capacity for the chief information officer of a Fortune 500 company. Both of us have strong personalities and irreconcilable differences. I've been successful with the company and hold a well-paying position, but have no opportunities for advancement.

My boss would like to see me resign, and for the last 18 months he has done everything possible to make my life miserable. Will resigning affect my desirability as I search for a new position?

A Conduct your search from a position of strength. Retain your position until you secure suitable employment elsewhere. You may be toiling under difficult circumstances, but you may be better off in the long run. It is much more difficult to obtain employment when you are "between jobs."

Long, president of Long and Associates, is a consultant, lecturer and author in the field of information services. If you have a question you'd like him to address, send it to Larry Long, Editorial Department, Computerworld, P.O. Box 880, Framingham, Mass. 01701.

PILLER

POWER SYSTEMS FOR COMPUTERS

I hear that IBM is now offering a Model 3089 415Hz frequency converter for their 3081 series mainframes.

That's right. But we've been using Piller 415Hz frequency converters on all our IBM CPUs for years, and their 40 KVA unit is designed for IBM's 3081, 3083 and 3084 CPUs.

And the Piller Silentblock units have the highest reliability available in the industry.

I don't think IBM offers paralleling with their 3089. That means we won't be able to parallel for redundancy or system growth as we have always been able to do with Piller.

Piller meets all IBM specs, they're proven reliable, and they offer paralleling. I say we go with Piller for our new IBM 3080 series CPU.

Theme #5



YES! I would like more information on PILLER 40 KVA Power Stabilizers and Paralleling Equipment.

NAME _____
TITLE _____
COMPANY _____
STREET _____
STATE _____ ZIP _____
TELEPHONE _____

WE INTEND TO: ☐ BUY ☐ LEASE
CW 9/26/83



CONTROL SYSTEMS, INC.

South Plank Road, Middletown New York 10940
Phone. (914) 355-6741 TELEX No 13-7428

Planning, Standards Also Needed

Cooperation Seen Essential to System Integration

By Robert Batt

CW West Coast Bureau

SAN FRANCISCO — Cooperation, planning and standards are essential if the current difficulties in integrating mainframes, personal computers, time-share systems and office automation equipment are to be overcome.

Presenting this view at the Third Annual Conference on Personal Business Computers held here last week, Jack Geer, vice-president and group systems manager at Bank of America, said user help is needed in prioritizing and defining business computing requirements.

"More effort will be required of users to manage and understand technology because as computer technologies become an integral part of business, all personnel will be affected," he said.

Lack of Understanding

Geer claimed the present lack of understanding of the issues by end users is exacerbated by confusing market claims and the existence of systems that have local-scale applications while lacking the ability to integrate into a large corporate environment.

"When users select systems that cannot be integrated, effectiveness can be limited, and systems may need to be prematurely replaced. This problem can be minimized by information workshops to educate line managers to the realities and appropriate uses of computer technologies," he told the conference, which was sponsored by the National Institute for Management Research.

Major users of computers, Geer contended, need to understand that information is a resource that must be managed as an integral part of the overall business. To provide appropriate user information, end-user computing support groups should be set up, and they will be needed to understand individual business re-

quirements and priorities.

"In addition, they will need to understand new technologies that are developed by internal corporate technology development groups as well as vendors to assist users effectively in fully utilizing appropriate systems within their units," he added.

Geer told his audience it is better to plan and then design appropriate systems to accommodate computer hardware and support the needs of users than vice versa. The job of end-user computing groups, he maintained, is to find solutions for information resource issues, both technical and human.

"To accomplish this, end-user computing groups will require senior management support in understanding the issues and direction from senior management in developing a strategy to define coordinated information management goals and business goals," he said.

Turning to the question of standards, Geer said software will be the key product for the next 10 years, but it will be difficult to standardize specific software products needed to ensure evolution to more productive levels.

"For this to happen, it will be vital that corporations do not lose the training, understanding and produc-

tivity achieved from existing systems as software becomes more efficient and user-friendly and as fourth-generation languages are developed."

Concerning standards in communications technology, Geer said a key requirement is that users have the ability to communicate back and forth with a variety of systems and be able to file and retrieve information. Given that most systems are used as stand-alone devices, he asserted, it is inappropriate to determine present or future requirements or define standards and technologies by using existing word processing systems for establishing standards about file-level compatibility.

The IBM Modem: high availability with rock-steady reliability.

A modem is only as good as its signal quality and its availability. The IBM Modem, thanks to an advanced IBM microprocessor, offers excellent signal quality, high availability and rock-steady reliability.

It shows its ability on networks large and small, especially the complex kind that present the toughest operating problems.

The IBM Modem helps you manage your network. For example, it continuously analyzes telephone line quality. If a line degrades, the modem adapts its signal so that data transmission is maintained. And, working with IBM software available for many host systems, it alerts the operator and pinpoints the source of the problem.

The IBM modem family includes the 3863, 3864 and 3865, with a line speed range of 2400 to 9600 bps. They work on standard, unconditioned lines, including switched lines. In point-to-point and multi-point configurations. With fast turnaround at all speeds.

Combine all this with IBM service and quantity discounts and you'll agree, IBM has the modem to meet your data transmission and network management needs.

For a free brochure or to arrange to have an IBM representative call you, telephone us toll free at 1 800 631-5582 Ext. 90. In Hawaii or Alaska, 1 800 526-2484 Ext. 90.

Try a set of IBM Modems for up to four weeks through the special IBM Modem trial program.

IBM



IBM Corporation
Direct Response Marketing
Department 7AG/522
400 Parson's Pond Drive
Franklin Lakes, New Jersey 07417

- ☐ Please have a representative call me.
☐ Please start me on the four-week trial.
☐ Please send me more information on IBM Modems.

Name _____
Title _____ Phone _____
Company _____
Address _____
City _____ State _____ Zip _____
CW9/26

Prime User Meet Set for Nov. 6-8

WOOD DALE, Ill. — The Central Prime Users Group will hold its sixth annual meeting Nov. 6-8 at the Arlington Park Hilton in Arlington Heights, Ill.

The meeting, for all users of Prime Computer, Inc. systems, will include discussions on maximizing system throughput, the role of the system administrator and Prime's source-level debugger. According to the Users' Group, this list of topics is tentative and subject to change.

The meeting committee is still looking for speakers and for people willing to lead group discussions at the conference.

The meeting fee is \$70 for Prime users. The vendors' fee is \$100. Ports on the Prime 2250 system are available to vendors for purposes of demonstration for \$300. More information is available from Central Prime Users Group, 130 North Ash, Wood Dale, Ill. 60191.

“Peugeot’s automated manufacturing saves time, money and inventory through the unique capabilities of the Tandem NonStop™ System.”

Patrick Remy, Chef de Project
Automobiles PEUGEOT, Centre de Sochaux

“At our Sochaux plant, Peugeot relies on a Tandem NonStop Computer System to coordinate manufacturing as many as 4,000 cars at any one time, each being built to a custom order. The system tracks each of thousands of components from the beginning of car body, engine and axles through roll-out of the finished car. The system assigns serial numbers to the cars, counts production and measures it against target goals, monitors workflows and chaining of assembly processes, synchronizes subassembly mounting, prints out set-up cards, and schedules the evolving definition of each car as it moves down the line.

“The system includes automatic data capture through bar code scanning and fully interactive control mechanisms to coordinate interlocking workflows in all areas of the production cycles. The ability to incorporate subsets enhancing labor deployment and automated assembly equipment is built into the system.

“Since the production control system must be 100% available or assembly comes to a halt, the Tandem Non-Stop System was the only logical choice. Not only that, the computer’s easy-to-use programming tools and outstanding performance in on-line transaction processing made it particularly well-suited to our needs.

“The system was evaluated, installed, and up and running within 22 months — two months ahead of schedule and considerably under budget.

“The ease of programming the system and training the staff resulted in enormous savings. The system has more than paid for itself preventing shutdown of the assembly lines. Equally important, the ease of expansion and the flexibility of the system enable us to adapt to new requirements rapidly, without losing any of the gains we have already accomplished.”

The NonStop System. Uniquely expandable to a worldwide network without



one cent of loss in original hardware or software. Information from every one of your locations at your fingertips, on a continual basis, without fail. To help you run your business better.

Tandem. Fully supported by a worldwide sales, training, service and manufacturing organization.

For information on how a Tandem NonStop System can improve your productivity or your P/L statement, call your local sales office or Tandem Computers Incorporated, 19333 Vallco Parkway, Cupertino, California 95014, U.S.A. Toll Free 800-538-3114 or (408) 725-6000 in California.

TANDEM

NonStop Computing Systems

YOUR KEY TO COMMUNICATION NETWORK COMPATIBILITY.



THE COMPATIBILITY DILEMMA

The need for compatibility among the wide range of computer systems and terminals in the modern corporate communication network has never been greater. The use of distributed systems to solve business problems brings computer power to the end-user, and poses a growing challenge to network compatibility with mainframe hosts.

The problem is how to efficiently and economically integrate these information processing systems into existing and future networks.

THE WALL DATA SOLUTION

The DCF Series of communications controllers from Wall Data addresses the compatibility dilemma by providing protocol compatibility gateways into a variety of network environments.

3270,3770 AND 5251 SNA/SDLC SUPPORT

DCF Series systems enable asynchronous terminal networks and synchronous hosts to communicate compatibly. ASCII terminals and printers attached to a single DCF system function

as 3278/87s in both SNA and BISYNCH networks.

For applications requiring access to SNA networks for batch data transfer from asynchronous minicomputers or batch BISYNCH devices, the DCF Series offers 3770 SDLC compatibility.

And System/34 and /38 installations can use the DCF Series to support ASCII terminals and printers as 525X SDLC devices.

MULTIPLE PROTOCOL SUPPORT

In fact, the exclusive "concurrency" feature of the DCF Series permits up to six protocol conversions to run to six separate hosts at the same time. No other communications controller in its class offers this flexibility.

And as protocol support requirements in your organization change, additional protocol support may be easily added using remote software downloading.

DYNAMIC RECONFIGURATION

The unique, software-based architecture of the DCF Series enables users to integrate new devices—personal computers,

minicomputers, ASCII terminals and mainframes—into SNA, BSC and other non-IBM network environments.

A menu-driven local configuration facility enables users to tailor protocol and device support to an evolving network.

AUTOMATIC BACKUP AND REMOTE DIAGNOSTICS

The DCF Series provides this flexibility with the highest level of reliability available. DCF Series systems feature standard redundant hardware and automatic backup without user intervention, to insure maximum network availability.

And with Remote Diagnostic Support, Wall Data can assist customers in identifying potential software problems.

THE "FACILITATOR"

Wall Data's business is to facilitate communications compatibility. The DCF Series of communication controllers enables both OEM's and end-users to systematically integrate their multi-vendor systems into a compatible network.

CROSS INDUSTRY APPLICATIONS

Companies in the insurance, banking and manufacturing industries are already enjoying the benefits of reduced line costs, lower communications equipment expenditures and greatly improved computing resource management.

For information on how Wall Data can help you make your network communication investment more productive, call our headquarters today.



The Data
Communications
Facilitator.

Wall Data Incorporated
14828 Northeast 95th Street
Redmond, Washington 98052
206 883 4777

*S/34-38 support available 9/83

At Business Micro Meet

DSS Planning, Strategy Urged

By Robert Batt

CW West Coast Bureau

SAN FRANCISCO — Decision support systems (DSS) require carefully laid out strategies and plans if they are to be effectively implemented in large organizations, according to an industry expert.

In a paper presented here at the Third Annual Conference on Personal Business Computers sponsored by the National Institute for Management Research, Lawrence Provisor, principal at the management consulting firm of Index Systems, Inc., maintained that DSS planning is not receiving the attention it needs.

"In the world of conventional transaction processing, operational or management information systems, managers increasingly devote very substantial effort to the development of comprehensive long- and short-range systems plans. But practically no one makes this same sort of effort for DSS planning," he complained.

For most organizations, Provisor contended, planning for DSS is not a top priority because it represents a small proportion of present information systems expenditures and, therefore, does not take up many of the resources allocated to information systems staff.

However, he contended decision support systems comprise the fastest growing segment of the information systems portfolio, aided and abetted by a growing supply of tools available as mainframe packages, on inexpensive personal business computers.

"If one looks ahead, it is not difficult to see the day approaching when, in many organizations, decision support systems activity and its attendant end-user computing will represent a clear majority of information systems expenditure and usage," he predicted.

Even today, the consultant continued, there are a few information systems managers who have allowed this sort of growth to occur in a poorly planned fashion and, as a result, have either had their management clamp a tight lid on their budgets or have seen the DSS/end-user area taken over entirely by another part of the organization.

In the face of the growth of DSS, Provisor attested, information systems managers are exhibiting two very different kinds of behavior: pushing and controlling. Pushing organizations, he claimed, are characterized by lots of doing but not much

managing in the DSS area, whereas in the controlling approach, there is lots of managing but not much doing.

"In neither case is there much overall planning going on anywhere," he noted. "Both the pushers and the controllers are responding to valid pressures and risks but are failing to recognize that doing and controlling are

separate pieces of an overall process that starts with planning."

On the question of selecting personal business computers and their attendant DSS software, Provisor suggested that information systems managers make a thorough analysis of their decision support requirements before purchasing a system.



Saving you up to

50%

on your hardware needs

YOUR ALTERNATIVE SOURCE FOR PRIME COMPUTERS AND PERIPHERALS

1st solutions

...The Alternate Source

A Datamation Services Inc. Company
2001 East Campbell Avenue
Phoenix, Arizona 85076**(602) 957-0999**
Ask for Don or Matt

Sleeves of Tyvek® protect your data investment better than paper. Here's why:



1. TYVEK* spunbonded olefin has more than twice the strength of good quality paper.
2. TYVEK does not lint.
3. TYVEK is smooth and nonabrasive.
4. TYVEK is chemically clean...has a neutral pH.
5. TYVEK reduces static problems.
6. TYVEK is unaffected by water.

With TYVEK, you don't have to compromise on any important sleeve criteria. You get it all. That's why TYVEK is still the best way to protect your diskettes.

For more information, write: DuPont Company, Room X39683, Wilmington, DE 19898.

*DuPont registered trademark.
DuPont makes TYVEK, not sleeves.



Network Stretched Between Cities

University's Tape Library Supports 200 Users

SYRACUSE, N.Y. — With more than 200 terminals around the Syracuse University campus in a network stretching from New York City to Utica, N.Y., the university's Administrative Data Processing (ADP) department has a staggering tape library management task.

Joe Canestraro, manager of computer operations for the university, said his department "serves all the administrative departments of the university and a good number of academic departments."

The department was formed as a separate entity in 1977 when administrative DP functions were split from academic DP functions. "The tape library was in a state of near chaos or controlled mayhem," senior systems programmer Linda Rodriguez recalled recently. "ADP decided to straighten things out with a tape library management system."

Valu-Lib, a tape library management system produced by Value Computing, Inc. of Cherry Hill, N.J., was installed at that time. This past July, the department switched from an IBM 4341 to an IBM 3083, at the same time installing Version 4 of the Valu-Lib package.

Training Made Easier

With more than 200 authorized users spread about the campus and along the network, Canestraro said he has found the new version makes training easier. After he spends a full day going over commands, "New lead operators can use Valu-Lib proficiently in one to two weeks."

As the main end user, Canestraro also appreciates the thoroughness and reliability of the system's standard reports. "We use the retention report to help control catalog tapes and to avoid a lot of problems. We have never lost a tape because of Valu-Lib," he said.

In addition, the product's reports have helped Canestraro keep the number of tape volumes from "growing exponentially because we can keep an eye on what tapes a user had."

Canestraro found enhanced communications facilities far more convenient for everyone to use. "Under previous releases, operators had to come into my office and use my master console, which was cluttered up

with thousands of messages. Now, through CICS or Vtvm it's so much easier . . . They run a batch report in the morning, pull tapes and then do the necessary changes to [volume serial number] commands to verify cleaning dates and so forth."

The redesigned package offers all of its facilities in both on-line and batch modes.

Systems programmer Rodriguez installed the new version and concluded, "It's a much cleaner system now. Value Computing Subsystem works with IBM code and concepts, not in spite of them." She also found it less structured than the previous version.

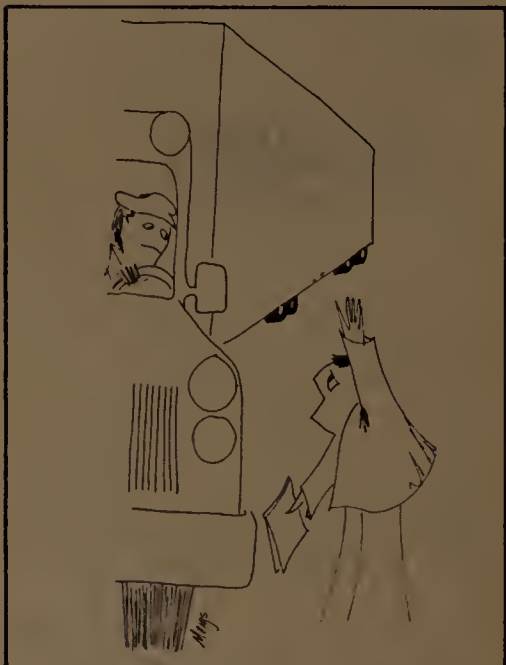
Menu screens enable new operators and system programmers to master the system and become productive in a short time. "The data is at your fingertips — you never have to worry about a tape's status. Here you have a great interactive tool with none of the drawbacks of an unwieldy batch job," Rodriguez said.

"When you scratch a tape using Valu-Lib, it's gone immediately," Canestraro said. "It can be hard for people accustomed to other tape library systems to believe this — they're used to having a measure of 'safe' time before the tape is really scratched."

He added that operators can use

any on-line terminal in the data center; up to 20 different user identifications can be signed on at a time. Each site can define user levels in an internal table, so that access to data base maintenance screens may be strictly controlled.

The operating system used presently is IBM's VS1 under VM, but at the end of the year a switch will be made to MVS, according to Joe Canestraro. "When we're on MVS, we won't be hemmed in by a limited number of partitions. So we'll let the programmers look up their own [volume serial numbers], and the like because we can restrict them to specific types of displays."



'Whoa! Hold the Truck a Minute — We're Going to Write a User Guide.'

EQUITABLE LIFE LEASING CORPORATION

ANNOUNCES OPERATING LEASES FOR:

 **Data General**

Eclipse® MV/8000 II Eclipse® MV/10000



System/36 or 38 4341 Series



VAX® 11/750 VAX® 11/780 VAX® 11/782



750 850 250II 550II

 **HEWLETT
PACKARD**

HP®3000 HP®9000



VS 100

We are a subsidiary of
The Equitable Life Assurance Society
of the United States, N.Y., N.Y.



For more information call any of the offices listed below

Atlanta
(404) 256-2434

Boston
(617) 237-3660

Chicago
(312) 296-6030

Cincinnati
(513) 489-3900

Cleveland
(216) 398-4800

Dallas
(214) 659-9730

Denver
(303) 761-3290

Detroit
(313) 646-9333

Houston
(713) 977-5761

Kansas City
(913) 642-8450

Los Angeles
(213) 493-5431

Milwaukee
(414) 785-9797

Minneapolis
(612) 944-8740

New York
(201) 881-8200

Philadelphia
(215) 628-0350

Phoenix
(602) 275-0194

Pittsburgh
(412) 343-8122

St. Louis
(314) 621-6732

San Francisco
(415) 982-0818

Seattle
(206) 455-3723

**SUBSIDIARY
EQUITABLE/OMNILEASE
CORPORATION**

San Diego
(619) 453-0881

Boston
(617) 890-4000

Philadelphia
(215) 646-6300

Silver Springs
(301) 792-4933

CORPORATE HEADQUARTERS

San Diego
(619) 453-0881

Eclipse is a registered trademark of Data General Corporation. IBM is a registered trademark of International Business Machines Corporation. Digital is a registered trademark of Digital Equipment Corporation. Wang is a registered trademark of Wang Laboratories, Inc. HP is a registered trademark of Hewlett-Packard Company. Prime is a registered trademark of Prime Computer Corporation.

Packages Help Schools Manage 230,000 Students

MIAMI — The administrators of Florida's Dade County School District, the fourth largest school system in the U.S., have met the challenge of tending to the academic needs of nearly a quarter million students.

The district keeps track of the 230,000 students in more than 250 schools through the use of Software AG's Adabas, a data base management system, and Natural, an on-line applications development system, in a series of districtwide data base systems.

According to Al Saber, director of operations at the Dade County school district's DP center, both packages "have been instrumental in enabling Dade County to keep track of its students and to implement a

range of systems such as electronic mail, individual students' school assignments, grade reporting, class ranking, textbook inventory, school construction and food services."

The school district's data base was established four years ago. The computer center uses National Advanced Systems, Inc.'s 9050 with 16M bytes of main memory and 16 channels and IBM's OS/MVS operating system. The selection of Software AG's products came after a detailed evaluation of several offerings.

One of the key selection criteria was on-line query response. Additional criteria included ease of installation, ease of use by both DP and non-DP personnel, data base creation time, security, adaptability, backup

and recovery provisions, impact on computer facilities, quality of support personnel, documentation and training.

Biggest Benefit

According to DP Director Gene Brewer, one of the system's biggest benefits was the implementation of an electronic mail service, which provided immediate distribution of memos to and from its elementary, junior high, senior high and vocational schools.

"Administrators log on every morning and afternoon, and the messages are automatically distributed to the right people," said Brewer. "Errors are few and far between, and there are no excuses not to know

what's happening."

Prior to the electronic mail system, intradistrict communications relied heavily on a telephone tree for urgent messages. The superintendent or an assistant would personally call the principals of the 24 senior high schools, who in turn would pass the word to the 46 junior high principals, who would then call the nearly 200 elementary schools.

"Having a terminal right there in the office allows each administrator to get the information he needs without waiting. Also, memos don't get lost," Brewer said.

District Data Base Administrator Allen Stedman attributes much of the success of the system to the on-line applications development system.

"Natural's ad hoc ability is terrific," he said. "Most of the staff, though traditionally Cobol-oriented, found training in Natural took a minimum effort."

Group to Fill Gap Between Users, Academicians

By David Myers
CW Staff

NEW YORK — Seeking to "fill the gap" between academic conclaves and users groups, the Association of Computer Professionals has set up shop here as a nonprofit trade organization.

Sy Bosworth, president of the group and a 15-year consultant in the computer industry, said the ranks are open to programmers, software developers, hardware designers, consultants, teachers, marketers, writers and students. The group's aim is to exchange information while promoting its members' careers, he said.

"My feeling was that there was a gap between academic organizations which have a largely theoretical orientation and the microcomputer groups who are mainly user groups," Bosworth said in explaining why he had founded the association.

The latest computer industry trade group will publish a monthly newsletter devoted to technical developments in software and hardware as well as marketing techniques and what Bosworth called "earnings opportunities."

Breakfast meetings and a lobbying effort are also possibilities, he said. Dues are \$55 a year, but a charter membership in the group costs \$10 less, according to Bosworth. Student memberships are \$20.

Bosworth said he had provided all the initial funding for the group, but stressed it is "a nonprofit, mutual benefit organization. It was not set up for a return on an investment."

Bosworth emphasized that there are no minimum age or academic degree requirements for membership.

"A person working at home on a program he hopes to sell is by that definition a part-time professional. Some of those who could be potential members are professional vandals — hackers. We hope to turn them to good instead of evil," Bosworth said.



EQUITABLE LIFE

LEASING CORPORATION

ANNOUNCES

TAX PRICED LEASES FOR:



Data General
Eclipse® MV/8000II Eclipse® MV/10000



IBM®
System/36 or 38 4341 Series



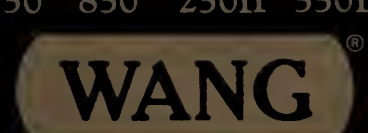
digital
VAX® 11/750 VAX® 11/780 VAX® 11/782



PRIME®
750 850 250II 550II



**HEWLETT
PACKARD**
HP® 3000 HP® 9000



WANG®
VS 100

We are a subsidiary of
The Equitable Life Assurance Society
of the United States, N.Y., N.Y.



EQUITABLE LIFE

LEASING CORPORATION

For more information call any of the offices listed below

Atlanta (404) 256-2444 Boston (617) 237-3666 Chicago (312) 296-6000 Cincinnati (513) 489-3900 Cleveland (216) 398-4800 Dallas (214) 659-9730	Denver (303) 761-3290 Detroit (313) 646-9333 Houston (713) 977-5761 Kansas City (913) 642-8450 Los Angeles (213) 493-5431	Milwaukee (414) 785-9797 Minneapolis (612) 944-8740 New York (201) 881-8200 Philadelphia (215) 628-0350 Phoenix (602) 275-0194	Pittsburgh (412) 343-8122 St. Louis (314) 621-6732 San Francisco (415) 982-0818 Seattle (206) 455-3723	SUBSIDIARY EQUITABLE/OMNILEASE CORPORATION San Diego (619) 453-0881 Boston (617) 890-4000 Philadelphia (215) 646-6300 Silver Springs (301) 792-4933
---	---	--	---	--

CORPORATE HEADQUARTERS
San Diego
 (619) 453-0881

E is a registered trademark of Equitable Life Assurance Society of the United States. Data General is a registered trademark of Data General Corporation. IBM is a registered trademark of International Business Machines Corporation. VAX is a registered trademark of Digital Equipment Corporation. Prime is a registered trademark of Prime Computer Corporation. Hewlett Packard is a registered trademark of Hewlett Packard Corporation.

Handles 1 Million Claims/Year

Insurer's Network Cuts Paperwork

RICHMOND, Va. — With the aid of a telecommunications network developed more than a decade ago, Blue Cross/Blue Shield of Virginia and about 80 of the state's hospitals are now enjoying some healthy benefits through the company's paperless claims processing system.

Until 1969, the state's health care providers had to fill out patient claim forms by hand before mailing them to Blue Cross/Blue Shield headquarters here, where the information in those forms was keyed into the company's IBM 3033 mainframe.

In that year, the company began a pilot interactive claims processing system whereby providers key patient claim information directly into the mainframe through terminals in hospitals and doctors' offices. The company originally employed Telex Computer Products, Inc. Model 241 terminals, but recently replaced them with newer Telex Model 476s.

According to John Lilly,

telecommunications consultant for Blue Cross/Blue Shield, both the company and the participating hospitals have benefited greatly from the system. The Richmond Plan has the lowest operating costs in the nation, owing to reductions in the need for forms and claims processing and mail room personnel. Lilly estimates that the network allowed the company to handle the more than one million claims submitted by hospitals last year at an average savings of approximately 20 to 30 cents per claim.

Because about 95% of claims is submitted via the telecommunications network, Blue Cross/Blue Shield employs only three claims examiners to review the remaining manually submitted forms. The company estimates that it would require an additional 20 people to handle that volume of claims without the system.

The system's interactive capability allows submitted claims to be adjudicated immediately, enabling hospitals to determine if a patient

is insured or whether a patient's particular coverage will pay for the care provided. Providers are also reimbursed on a more timely basis, with most claims processed in only 14 days.

"Hospitals are perfectly happy with this system," Lilly said. "The main benefit is better cash flow, which is very important. They also get immediate response to their patient inquiries. We can answer most questions right away."

As part of its automated claims processing system, Blue Cross/Blue Shield of Virginia has terminals in approximately 80 hospitals throughout the state, with 275 additional Telex terminals in the company's Richmond headquarters and another 26 terminals in nine district offices. A number of doctors access the mainframe directly from their offices using Texas Instruments, Inc. TI 765 microcomputers.

According to Lilly, similar systems have been set up at Blue Cross/Blue Shield agencies in North Carolina, Maryland and Florida.

ACM to Hold Meet Feb. 14 in Philadelphia

PHILADELPHIA — The 12th Annual Association for Computing Machinery (ACM) Computer Science Conference will be held at the Franklin Plaza Hotel in Philadelphia, Feb. 14-16.

The central themes of each of the three days are "Factory of the Future," "Coping with Small Computers" and "Social and Ethical Implications of Computers."

Speakers include Dr. Karl Kemp of McDonnell Douglas Automation Co.; Ernest W. Kent, National Bureau of Standards; Mark S. Fox, Car-

negie-Mellon University; Lawrence Tesler, Apple Computer, Inc.; Daniel D. McCracken, City College of New York; and Abbe Mowshowitz of Rensselaer Polytechnic Institute.

Fees for the conference are: members \$55, students \$10 and department chairmen \$100, all preregistered. Nonmember registration costs \$90.

Further information is available from Dr. Frank Friedman, Computer and Information Science Department, Temple University, Philadelphia, Pa. 19122.

UT Regents Approve MCC Center Project

AUSTIN, Texas — The Regents of the University of Texas (UT) System recently approved a \$20-million construction project to build office and research facilities at the university's Balcones Research Center here for the new Microelectronics and Computer Technology Corp. (MCC).

The board appointed Golemon and Rolfe Associates of Houston as the project architect for the MCC center to be built on 20 acres of the Balcones Research Center in northwest Austin, where about 25 other UT Austin science and engineering laboratories are located.

The university plans to provide \$5 million in funding for the project, with the remainder coming from the

private sector.

MCC, a national research and development venture involving more than a dozen private firms, will undertake cooperative research aimed at maintaining U.S. preeminence in microelectronics and computers, particularly in the fields of advanced computer architecture, component packaging, software technology and computer-aided design and manufacturing.

The Regents also approved a \$23 million construction project to renovate and expand UT Austin's Taylor Hall, which will house the Department of Computer Sciences, the Institute for Computer Sciences and Computer Applications and the Computation Center.

Multimedia Courses Available From ASI

ARLINGTON HEIGHTS, Ill. — Advanced Systems, Inc. (ASI) has announced the availability of four new multimedia courses:

- Created for senior management, "Executive Issues: Building the Computer-Based Architecture Bridge" provides architectural concepts and discusses computer-based architecture as a bridge between existing applications portfolios and the portfolios that must be developed to utilize the emerging technologies effectively within an organization.

- "MVS/SP JES2: Basic Operator Training" provides an introduction to MVS/SP JES2 operating environments by teaching the format of system messages and the differences between JES2 and MVS commands, as well as device control, system

control and job control.

- "Mapping Facilities for IDMS-DC, UCF and ADS/Online" teaches how to use IBM 3270-type terminals for screen mapping. It covers on-line mapping, integrated data dictionary integrations and user-friendly screen formats.

- "The ADS/Online Education Series and Reference Library" teaches the steps in developing an on-line system. It addresses the systems design, programming and tuning considerations of applications using ADS/Online.

The cost for the courses ranges from \$50 to \$100 depending on sale or lease time. Further information can be obtained from Pat Sorrentino, ASI, 2340 S. Arlington Heights Road, Arlington Heights, Ill. 60005.

*This advertisement is not an offer to sell nor a solicitation of an offer to buy these securities.
The offering is made only by the Prospectus.*

NEW ISSUE

1,400,000 Shares

DATA I/O

COMMON STOCK

Price \$16½ Per Share

Copies of the Prospectus may be obtained from any of the several Underwriters only in such states in which such Underwriters are qualified to act as dealers in securities and in which the Prospectus may be legally distributed.

Shearson/American Express Inc.

Hambrecht & Quist
Incorporated

Bear, Stearns & Co.

The First Boston Corporation

A. G. Becker Paribas

Blyth Eastman Paine Webber
Incorporated

Alex. Brown & Sons

Dillon, Read & Co. Inc.

Drexel Burnham Lambert
Incorporated

Goldman, Sachs & Co.

E. F. Hutton & Company Inc.

Kidder, Peabody & Co.
Incorporated

Lazard Frères & Co.

Lehman Brothers Kuhn Loeb
Incorporated

Prudential-Bache
Securities

L. F. Rothschild, Unterberg, Towbin

Salomon Brothers Inc

Smith Barney, Harris Upham & Co.
Incorporated

Wertheim & Co., Inc.

Cable, Howse & Ragen

Dain Bosworth
Incorporated

Foster & Marshall/American Express Inc.

Piper, Jaffray & Hopwood
Incorporated

Robertson, Colman & Stephens

September 19, 1983

Better Postured to Meet Change

Relational DBMS Provides Utility Flexibility

EVERETT, Wash. — The deregulation of the telephone industry in 1982 forced many previously regulated and noncompetitive companies to become competitive fast, or suffer.

General Telephone of the Northwest, a subsidiary of GTE Corp., was better postured than its competitors to meet the challenge even though it had no more warning of the impending deregulation than anyone else.

In 1980, General Telephone had chosen Tandem Computers, Inc. Nonstop systems to handle its on-line transaction processing needs. Part of the Tandem solution was a distributed, relational data base management system (DBMS) known as Encompass. The flexibility of the relational model enabled General Telephone to utilize its existing applications software even though data bases distributed across three states had to be reorganized to meet the new business requirements.

Prior to the decision to implement the Tandem equipment, General Telephone had been using minicomputers — one for each of 16 operating divisions — to maintain records of the customer information needed to run the business and an IBM 3033 mainframe to manage billing applications. Capacity, response time and expandability were problems.

"General Telephone's reasons for choosing Tandem included hardware and software costs, the modularity of design allowing for easy expandability, the fault-tolerant aspects, the transaction-oriented approach, [GTE Telenet Telecommunications Corp.'s] Telenet certification and relational and distributed data base management capabilities," according to Dave Hoogerwerf, information management systems supervisor.

The minicomputers were replaced with six separated Tandem Nonstop network nodes and the application software converted to run on the Tandem equipment. Additionally, the Tandem systems were configured between the IBM 3033 mainframe and the IBM 3270-type terminals used for the billing applications. The same 3270 terminals could now be used for both the customer data base application formerly handled by the minicomputer systems and the billing applications still handled by the IBM mainframe.

In January 1982, AT&T and the Department of Justice announced an agreement in which AT&T would become eight companies, all competing fiercely with General Telephone for business.

For General Telephone, the practice of having each operating region

manage its own phone markets and order systems was no longer practical. The information had to be available to the entire company and managed in a more centralized manner, Hoogerwerf said.

General Telephone regrouped its 16 geographic operating divisions into three functional regions, each with two Tandem nodes. As with the prior systems, each operating division maintained its own customer data, but now the data was grouped into the larger, functional regions. The six regional systems were linked together using Tandem Expand networking software. Through the network, each region now had re-

mote access to data located at the other regions as well as local access to its own data. The entire redistribution was accomplished with only minor changes to existing applications software, Hoogerwerf said.

The ability to change the focus of the business and data base was possible because of the relational nature of the data base. The structure of a relational data base is not fixed when the data base is created.

Connections between data items in a relational structure are "soft" pointers (key items) rather than "hard" pointers (record addresses). Data items are located by tracing them through logically related items,

no matter where they are located in the data base. This allows data to be reorganized without affecting the way it is accessed by application programs, Hoogerwerf noted.

In the case of General Telephone, the change in business needs required several types of changes to the data base. One change was in geographic location as operating divisions were reorganized into functional regions. Another was the new relationship of telephone instruments to the rest of the data base. General Telephone was able to implement all of these changes without extensive revisions to its applications software, Hoogerwerf said.

We Print Better Bottom Lines

SSI printers and computer/printer interfaces work better and faster

and they work for less

The more you know about SSI printers and interfaces, the easier your printing problems look.

We have answers. Answers to interfacing mainframes and minis to the printer you're using. Answers to plug-and-go compatibility with IBM. Answers to controllers (including long-line) for DEC, Data General, Perkin-Elmer, Texas Instruments. Serial interfaces,

synchronous and asynchronous, with the protocols you need.

And we make printers. Printers with eye-opening performance, at eye-opening prices, from 140 cps up...to five times higher than their counterparts. They drive further distances...cost as little as half.

For state-of-the-art, we offer you our Mercurion 1 printer system—using non-impact ion deposition imaging and giving you speeds to 5,280 LPM (a page per second). Resolution is 240x240 pixels, landscape or portrait. It's really time you knew us. That's the bottom line. Call or mail the coupon now.

SSI Southern Systems, Inc.

2841 Cypress Creek Road
Ft. Lauderdale, FL 33309.
(305) 979-1000 (800) 327-5602
Telex 522135

Southern Systems Canada:
(416) 229-2589

I want to print better...
with a better bottom line.

- ☐ We have a _____-type computer.
☐ Have rep contact me.
☐ Send me literature. Our major interest is _____

Name _____

Title _____

Company _____

Address _____

City, State, Zip _____



Bank Goes Down OA Path to Hike

SAN FRANCISCO — Crocker National Bank's quest for a multiuser computer system was prompted by the same initial force that sends other corporations down the office automation path — a desire for increased productivity. But, whereas many companies have concentrated on increasing the output of their clerical support functions, Crocker's main focus was to enhance the performance of its professional and managerial staff.

Specifically, as the banking business becomes increasingly complex and competitive, it was important that Crocker's staff bring the resources of the computer to bear on unstructured tasks such as analysis, planning and control. The use of computers in the support of managerial and staff functions allows better decisions faster, the translation of decisions into actions sooner, the ability to offer new and better services to customers and the ability to exercise closer and broader control over operations.

On a practical level, account managers can increase their field service schedules as administrative details are executed more efficiently, as well as have more time to seek out new business. Clients also benefit because a properly organized computer system can facilitate more rapid credit approvals and rejections.

Initial Survey

An initial survey of the needs of prospective users within the Crocker organization revealed a combination of applications — word processing, data base management, budgeting, modeling and communications — that mandated selection of a high-end, multiuser, multi-tasking system.

Before beginning a search for the right system to suit its needs, Crocker decided to design a pilot program to introduce and evaluate the chosen system under controlled conditions. There were several advantages to this approach.

A key benefit was that the organization could gain experience in introducing the system, training personnel and establishing support procedures, greatly reducing the time required for other personnel to learn the system during future corporate-wide installations.

Using a pilot group to experiment with a new system also minimizes the risk of a failure or of new technology causing widespread confusion and bogging down daily operations. It also allows an

organization to measure carefully the results of the system's introduction on the daily routine so that quantitative along with qualitative results can be assessed in making a final evaluation of the system.

Crocker selected its pilot sites on the basis of probability of successful installation, functional similarity to other areas of the bank and potential for a worthwhile return

on its investment.

The sites selected were all part of the Metro Banking North Group of the Business Banking Division, responsible for the development and administration of banking services to mid-market commercial enterprises in northern California. The staff members selected for the pilot study were all high-interest/high-aptitude personnel, and their functional activi-

ties, from secretarial to managerial, were studied to obtain a precomputer performance baseline.

With sites and personnel for the pilot study selected, a task force of the Metro group decided the relative priorities of system requirements previously laid down by an office analysis study.

The proposed computer system would be required to address the tickler system

used by account officers and account administrators for the administration of current accounts, turnaround time for text production, profit planning and tracking, marketing information and tickler system for follow-up on new business prospects, fee billing and collection, internal reporting and communications, access to account status and relationship profitability analysis and

**I THOUGHT I
HAD TO CHOOSE BETWEEN
TOO LITTLE POWER PROTECTION
AND TOO MUCH COST.**



Productivity of Professional Staff

credit analysis on loan requests.

Once the pilot program was set up, Crocker's attention turned to the actual search for the computer system. Requests for proposals were sent to 38 companies, with 21 responding by the deadline, including IBM, Digital Equipment Corp. and Burroughs Corp.

Architectures ranged from a central minicomputer host

connected to an assortment of word processors, microcomputers and terminals to a distributed microcomputer system connected by local-area networks, on the other. Costs ranged from \$200,000 to \$500,000.

Based on the Metro group's system requirements, the geographical dispersion of the group and the project's staffing resources, several factors were consid-

ered when judging the various proposals.

A distributed approach was preferred to host-based systems because it did not require high-speed lease lines, depend on a single processor, require special environmental conditions such as air conditioning or special operating personnel or experience severe system degradation as the number of users increased.

A standard operating system was preferred because of the greater flexibility in adding application software and customizing the system to suit Crocker's particular needs. The bank also insisted on easy-to-learn, easy-to-use software that included menus, on-screen Help facilities and well written documentation. It wanted to avoid the necessity of constantly retraining personnel

or reentering data because of complex, awkward-to-handle software.

Vendors Selected

From the initial pool of 21, five vendors were selected for additional discussions, and then demonstrations and information for further analysis were requested for three systems.

A benchmark test was designed to simulate the typical activities that would be performed on the system, and the final benchmark competition was held between two manufacturers. In addition to the objective competition, Crocker's evaluation team, comprised of five Metro staff members and the project manager, spent an afternoon gaining hands-on experience with both systems side by side.

The Fortune Systems Corp. 32:16 microcomputer was the unanimous choice of the evaluation team. Its ease of use and detachable keyboard were strong points in its favor. While the pilot program will continue through Dec. 1, it is possible to make some general characterizations about the bank's experience with the 32:16 microcomputer.

Best System

"While it is not, as some might claim, the greatest thing since sliced bread, it is by far the best computer system that would solve our needs and still be within an acceptable price range. The bottom line is that much more front-end training and system administration would be required to reach the same level of productivity we've now attained if we were operating on a larger host such as a DEC VAX-11, Wang Laboratories, Inc.'s OIS or IBM's Series/1," said Kurt Schweer, Crocker's vice-president and manager of advanced office systems.

"The documentation has been excellent. Our technician, who didn't know the Fortune machine or its Unix operating system, was able to connect all peripheral devices, load all software and set up accounts on our system in a single afternoon by simply following instructions in the manual," Schweer added.

Another benefit has been Fortune's "one-phone-number-for-all-problems" approach to field support. For example, Crocker once had a problem with the system not printing reports from the Multiplan spreadsheet program. A call to Fortune established that the cause was a recently uncovered software error that the bank was able to fix itself.



THEN I FOUND THE EXIDE ELECTRONICS SERIES 2000 UPS.

Traditionally, for moderate sized main-frame computer installations, it was a choice between two undesirables: too little power protection and too much cost. Voltage regulators or line conditioners left them vulnerable to flickers and power outages; uninterruptible power supplies provided all of the protection, but at too much cost.

Now there is a better alternative. The Exide Electronics Series 2000 UPS: it gives you complete protection at an installed cost as much as 30% below other UPS systems in its class. The Series 2000 provides complete protection

against spikes, transients, line noise, brownouts and blackouts. Whatever happens, your equipment and your data are protected.

A UPS SYSTEM THAT BELONGS IN THE COMPUTER ROOM!

Just as the Series 2000 fits your budget, it also fits your computer room. The

compact system, including battery pack, requires only 16 square feet, less than a third of the space needed for comparably rated systems. And it's light enough to be transported over computer room floors. Once in place, final installation is fast and simple.



UPS PROTECTION WAS NEVER THIS AFFORDABLE!

Exide Electronics' Series 2000 UPS is a new direction in uninterruptible power, designed specifically for the computer user who wants complete protection—without the cost and space requirements that have been associated with UPS. Look into the Series 2000 for yourself. It's the first UPS with big system performance at a small system price.

To: Exide Electronics, c/o Bill Campbell, PO Box 58189, Raleigh, NC 27658
☐ Please send me more information on the Series 2000 UPS
☐ Please have a salesman call.

Name _____
 Title _____
 Company _____
 Address _____
 City _____ State _____ Zip _____
 Telephone _____

EXIDE ELECTRONICS

P.O. Box 58189, Raleigh, NC 27658, 919/872-3020, TWX 510-928-0598

Superintendent Calls for DP Ethics Curriculum

RED BANK, N.J. — Spurred by what she terms as the "unanticipated negative,

Deltak Series Covers OA Systems

NAPERVILLE, Ill. — A five-course multimedia training series covering the complete development cycle of office automation systems has been announced here by Deltak, Inc.

Series 62-2XX, "Designing Office Automation Systems," is based on the experience and research of the Diebold Group, Inc., Deltak said. It is intended for people introducing office automation into their organizations or those wanting to improve the OA planning, design and implementation methodologies they presently use.

Fifteen to 20 hours are required to complete the five courses: "Planning for OA," "Initiating the OA Strategic Plan," "Completing the OA Strategic Plan," "Implementing OA" and "OA Technological Considerations."

The series was designed for system designers, users, office automation specialists, directors and first-line managers who need a specific methodology for office automation design, the vendor said.

Courses are available for an average rental of \$50 to \$125 per course, per month, depending on volume.

In addition to this, courses are available for purchase at \$1,750 each.

Further information on the series is available from Deltak, which is located at East-West Technological Center, 1751 W. Diehl Road, Naperville, Ill. 60566.

even frightening consequences" of computer use — evidenced by the recent attacks of hackers on private computer systems — the superintendent of schools here has drawn together a committee of teachers and local professionals to draft a DP ethics curriculum for the school system's 1,000 students.

Joan D. Abrams, superintendent of the school system here, said the ethics compo-

nent of the system's computer literacy program will stress the responsibilities students take on as they increase their technical knowledge. Abrams hopes that the ethics curriculum, which will be jointly taught in computer and social studies courses, will be ready by November for students in grades five through eight and by next year, for grades one through four.

"I see this as another way

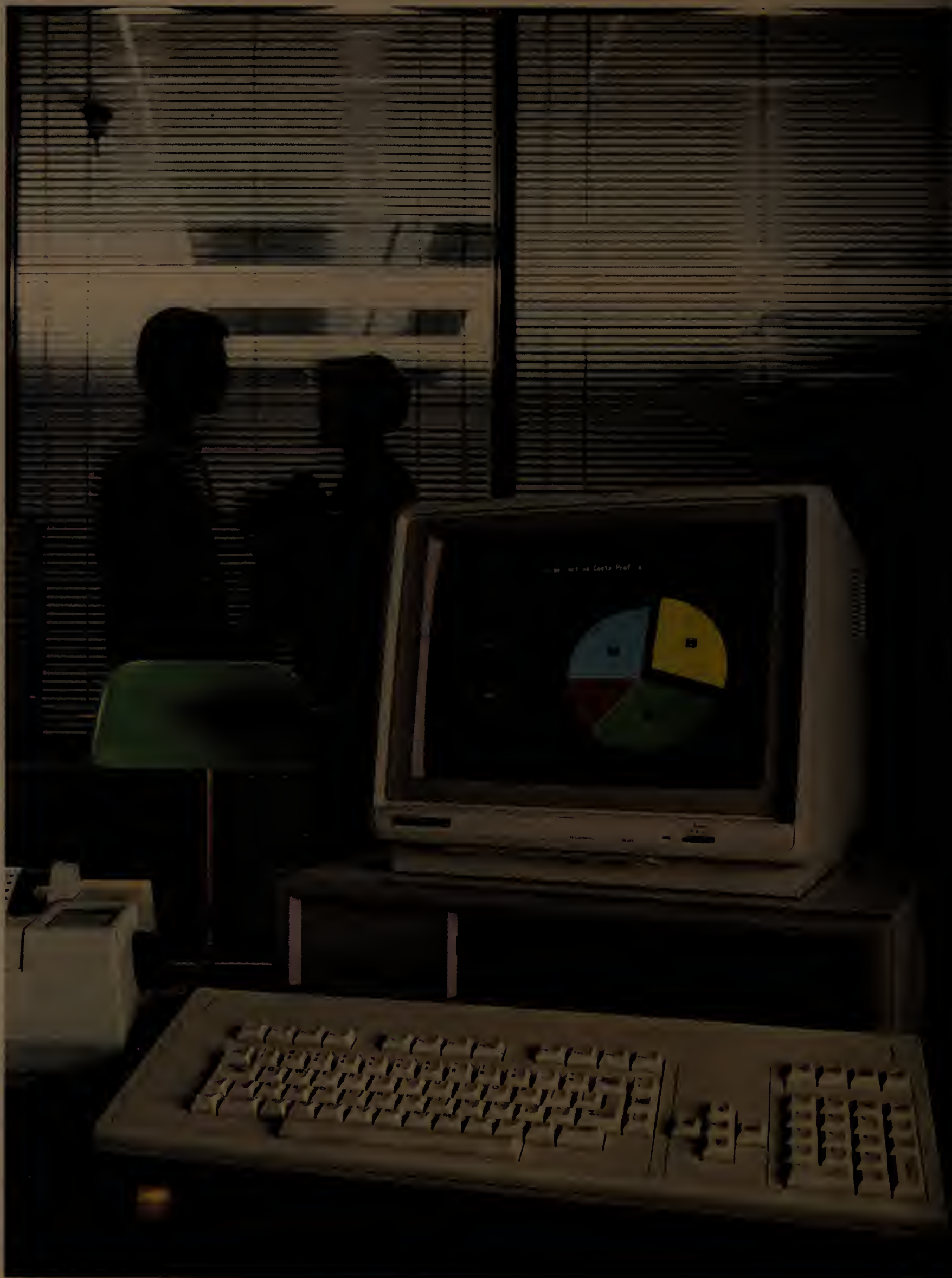
of teaching children the responsibilities of citizenship and the consequences of their actions," Abrams said. "While a computer itself may be value-free, it takes on human values when a human being uses it.

"These hackers see what they're doing as only fun; they don't understand the significance of their actions. It's nice to be one up on other people technically, but that knowledge carries with

it certain responsibilities," Abrams said.

The ethics curriculum is expected to focus on broad issues of morality in the early grades and become more specific in the upper grades, with emphasis on topics such as program piracy and unauthorized access of private computer systems.

Using Apple Computer, Inc.'s Apple IIe computers, the school system currently offers courses in DP literacy.



Call For Papers

SYNTOPICAN XII ADVISORY COMMITTEE, Chicago, July 17-21, 1984.

The theme for Syntopican XII is "Communicating Information: People, Systems, Networks." Professional papers are requested; topics should relate to the theme in either a technical or managerial sense.

The deadline for receipt of completed papers is Nov. 30. All submissions will be received and considered by the Syntopican Advisory Committee for possible presentation at the conference or for publication in the annual book *Papers and Proceedings*. Those selected will be notified as soon as possible.

To obtain a copy of "Guidelines for Preparation of Professional Papers," to propose a paper topic or to obtain additional information, contact James F. Casale, Director of Conference Planning, Aisp, 1015 N. York Road, Willow Grove, Pa. 19909.

Is It a Minicomputer or a Microcomputer?

By Jim Lowe

Special to CW†

When the term "minicomputer" was coined several years ago, it connoted a computer that was something less than a mainframe.

Manufacturers of this new breed of system were forced to be more particular than their mainframe counterparts about what markets they entered their products into because their machines were smaller in both capacity

and capability. But because the minicomputer's capacity and capability have increased over the past couple of years, the term "mini" is now relevant only to the machine's size.

What has made the word "mini" misleading is the discovery of the integrated chip. With this discovery "core" became "memory," and the size of the computer became smaller.

Given these develop-

ments, the word "mini" could be applied today to some mainframes. In time, one suspects, the so-called micros will intrude into the area once occupied by minicomputers. Once this happens, "micro" will also take on a new meaning.

The computer industry has always had a way of convincing companies they needed more computing capability and, therefore, needed to upgrade their systems

— systems that, in most cases, were doing an adequate job.

This happened when IBM convinced the business industry the old IBM 1401 and 1410 were outdated, and business needed to move up to the 360. At that time many companies had not completed their programming efforts, were not properly introduced to systems that required a great deal of sophistication, did not have

programmers trained on the 360 and, perhaps worst of all, had no upward path between machines other than emulation.

Emulation Trap

Many companies fell into this emulation trap and consequently never received any value by upgrading to the 360. Many data processing firms, including the one I work for today, are still trying to recover from this trick IBM played on the industry.

My job here was to bring the company from the Dark Ages of punch-card-related systems emulating the 360 and running under DOS operating software to a modern-day operation based around Hewlett-Packard Co.'s HP 3000 Series 64 and two HP 3000 Series 44 minicomputers.

The minis made it possible to use CRT terminals for on-line processing and data base concepts for on-line querying and updating. This configuration allowed the company to design screens that are readily understandable and useful and to process files and records at a high rate of speed.

Computer manufacturers are much wiser today. All programs they design for one model can run on an upgraded version without any software modifications. With this type of dedication to their systems, minicomputer manufacturers should be around for a long time to come.

Lowe is information systems director for A.C. Transit in Oakland, Calif.

Only the Texas Instruments Professional Computer offers these 7 advantages that add up to more computer for your money.

If you're a smart business professional, you want a business computer that gives you the most productivity power for your dollar. For you, Texas Instruments has the answer: the TI Professional Computer. With seven obvious advantages that make buying TI make sense.

The Disk Storage Advantage.

The TI Professional Computer gives you standard 320K floppy disk storage. That's twice the standard data storage of the leading competitor.

The Function Key Advantage.

We give you 12 function keys that you can easily preprogram to make your work simpler and easier. The best the competition can do is 10 or fewer function keys.

The Keyboard Advantage.

Our standard touch-typing layout makes word processing as easy as sitting at a typewriter. The separate numeric and cursor control keypads let you isolate information and enter numbers for spreadsheets more quickly. And with our isolated edit/delete keys, you'll never have to

worry about accidentally erasing valuable data.

The Monitor Advantage.

Our monitor gives you 40-50% better resolution than the leading personal computers. Which means you get clearer displays that are easy on the eyes. And some of the sharpest graphics possible today.

The Software Advantage.

There's software available now for the TI Professional Computer that meets virtually every professional and small business need. And with our memory expansion board, you can use advanced integrated software like Lotus 1-2-3™ to help you do several kinds of work without changing programs.

The Expandability Advantage.

Our standard features like the floppy disk controller and printer support are built-in so they don't take up the valuable expansion slots you'll need for adding optional features like communications and up to ten megabytes of hard-disk storage. Which leads to one of our most exciting advantages...

The Future Enhancement Advantage.

No one wants to buy a personal computer that's already on the road to obsolescence. That's why we're developing exciting new features that you can easily add to your TI Professional Computer—like speech recognition. Imagine being able to say, "Spreadsheet, please" and having it appear instantly on your monitor. This and more will be available this fall.

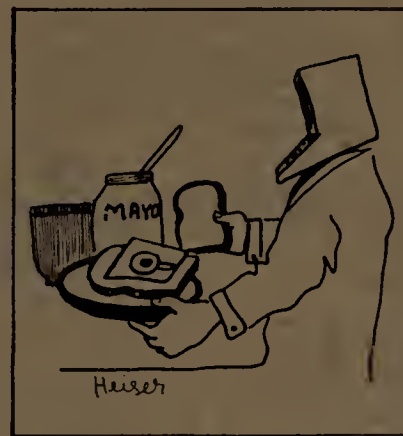
One additional benefit makes the TI Professional Computer especially attractive — the price. Feature for feature, dollar for dollar, you'll get more computer for your money.

Get the business computer that puts these benefits to your advantage. Visit your TI authorized dealer or write: Texas Instruments Incorporated, Dept. DCA-0630W P.O. Box 402430, Dallas, TX 75240. Or call toll-free: 1-800-527-3500.



TEXAS INSTRUMENTS

Creating useful products
and services for you.



Abuser Friendly Report Processor For IBM/38?

Managerial support
software that is truly
easy to use.

Call or write for more
details on FUSION 4/38.

FUSION
PRODUCTS INTERNATIONAL

(415) 381-1340
PO Box Fusion
Mill Valley, CA 94942
Telex 176099 FUSION

As Micro Capabilities Improve More Firms Seen Turning to Micros

ST. LOUIS — More and more companies, small and large, are turning to microcomputers to run their businesses. As the micro's capabilities improve, businesses are seeking out these relatively inexpensive pieces of hardware to solve their problems.

Some computer consultants, however, recommend minis to the majority of their small-business clients. But the recommendations depend on the needs of the individual small — 19 employees or less — business. Because these businesses are entrepreneurial in nature, they are reluctant to commit themselves to anything new, especially something as mysterious as a computer.



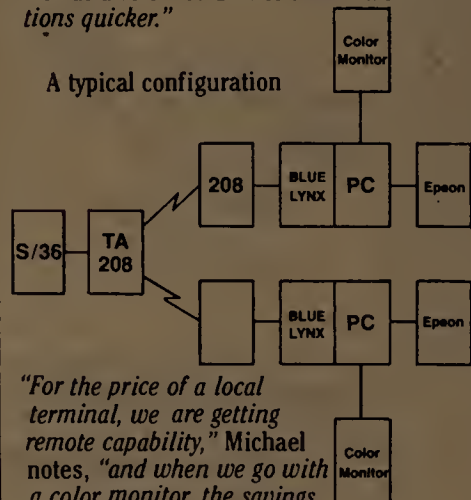
How Michael Krieger "dumped the dump"

Michael Krieger is DP manager of Augustus Fashions, Inc., a leading manufacturer of quality men's and women's clothing. His responsibilities include providing efficient communications between the firm's Manhattan factory and two showrooms, and its warehouses on Long Island and in New Jersey.

Before BLUE LYNX, Augustus Fashions had an IBM System/34 with local terminals only. Now they use the S/36 with BLUE LYNX-equipped IBM Personal Computers as remote terminals at their several locations—including the homes of the company's executives.

"BLUE LYNX has eliminated the need for us to waste thousands of dollars on IBM remote workstations," Michael says. "It has also enabled us to install workstations quicker."

A typical configuration



"For the price of a local terminal, we are getting remote capability," Michael notes, "and when we go with a color monitor, the savings are staggering."

BLUE LYNX terminal packages include:

3276 emulation with SNA/SDLC or Bisynch, hardware and software package \$690 complete or \$1230 complete for SNA/SDLC and Bisynch, software selectable

5251 emulation for S/34, S/36 and S/38 users, hardware and software package \$690

VTERM—DEC VT100/52 emulation software package (requires IBM Asynchronous Communications Adapter or equivalent) \$125

TECHLAND SYSTEMS 25 Waterside Plaza
New York, NY 10010
(212) 684-7788

*Software and support by Software Systems, Inc. for 5251 emulation BLUE LYNX is a trademark of Techland Systems Inc.

Each consultant interviewed has his own hand-holding method to soothe frightened first-time-user clients.

"Basically, I am just very open and honest and try to answer all their questions. As their knowledge of computers improves, their fears seem to dissolve," said Bonnie Moran, owner of Compuquest, a computer consulting firm in Oakland, Calif.

"The biggest fear seems to be what the computer is going to do to their businesses," explained Robert Gershon, president of Robert Gershon & Associates, Deerfield, Ill.

"It's a lot like keeping up with the Joneses. They just reach a point in their businesses where they can no longer operate without a computer and so do their competitors," according to Gershon.

Two Stages

Bert Robinson of RRA Consulting Services, Inc. of New York explained the fear in two stages.

First, there is the decision to buy a computer and second, there is the installation process, whereby the computer is actually placed in the business.

"I take all the important decisions away from them. I do the work and tell them step by step what will be going on. The decision can then be made more naturally because the pressure has been eliminated," Robinson said.

Consultant's Move

Once the decision to buy a computer has been made by a small-business owner, the computer consultant will take several steps:

- He will determine the business' major needs — accounting, word processing and the like.
- He will determine the software and hardware necessary to fulfill these needs.
- He will negotiate contracts with hardware and software vendors.
- He will install and program the system.
- He will train his client and employees to use the computer.
- He will be available, for at least the next few months, to answer any questions about the system and to make repairs if needed.

The consultant's major obstacle lies in the second step of the process — deciding which hardware his client requires. A lot depends upon his definition of "minicomputer" and "microcomputer."

Gershon said that the difference is simple. "The mini is a multiuser system, while the micro is a single-user system," he said.

But Robinson thought the real difference is cost, the mini being the more expensive of the two, but offering a lot more capabilities.

"The difference between a mini and a micro is about \$30,000 [the mini being the more expensive]," Moran said.

The consultants interviewed agreed that the primary advantage to a micro is that it is less expensive. A small-business executive needs these extra savings because his overhead is usually high and his disposable in-

come is low.

"I recommend to my clients that they really look at micros before they make a decision to buy a mini," Moran said. Micros are easier to find because they can be bought at a computer store, and a lot of them have multiterminal capabilities, much like the minis," she continued.

Another advantage to micros is training, Robinson said. "Implementation time is short because it is much easier to train yourself to use a micro," he added.

Gershon disagreed, however, claiming it is a misconception that it is relatively easy for a layman to teach himself to use a microcomputer.

"You can't get the proper training from a vendor or a manual. A first-time user always needs a consultant," Gershon said.

"Also, if something goes wrong with a micro, you have to bring it into the store to be fixed. When you purchase a mini, a vendor will come to you to fix the problem," he continued.

Robinson claimed that micros were at a disadvantage to minis in three major areas. First, the client finds it difficult to select the proper micro software packages when he shops in the store alone. He may not really know what the best package is for him, he said.

Second, micros do not have the networking capabilities of the minis to tie into other systems. Third, the peripheral, data processing and communications capabilities are not as strong in a micro.

Moran disagreed with both her colleagues. "There's such a broad range of micros with so many capabilities on the market today that I can't say there is a real difference between the mini and micro for a small company with uncomplicated business needs," she explained.

Unlike Moran, both Robinson and Gershon said that the mini is still the best computer for today's small business.

There are five primary advantages to the mini, according to Gershon: It is better for clerical support systems and has multiuser capabilities, vendor-supplied training, on-site maintenance and more flexible information storage.

"I've yet to see a small business [two- to three-member office] that can run on a micro only," Gershon said.

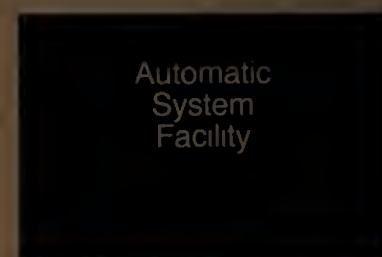
Robinson agreed, saying, "The only disadvantage to a mini is cost. Everything else is advantageous to the small business."

"The mini's expansion capabilities are very important to a small business because the computer can grow with the company."

Unlike her fellow consultants, Moran perceived several disadvantages to minis besides cost.

"The mini is still physically larger than a micro and in some cases requires changing the physical environment of the office — special flooring, air conditioning and so forth. Also, it is much easier to purchase a micro because there are so many available in the stores today."

Seminar: How to automate system development.



Seminars on Cullinet's IDMS/R with Automatic System Facility, and their entire line of software products, will be held in the following cities during the coming weeks.

Albany, NY	October 12
Allentown, PA	October 12
Anchorage, AK	October 20
Baltimore, MD	October 12
Bridgeport, CT	October 13
Champaign, IL	October 12
Chicago/Oakbrook, IL	October 13
Columbus, GA	October 12
Davenport, IA	September 27
Denver, CO	October 11
Des Moines, IA	September 28
Edmonton, ALTA	October 13
Evansville, IA	September 27
Halifax, NS	October 13
Houston, TX	September 29
Huntsville, AL	October 12
Jackson, MS	October 13
Jacksonville, FL	September 29
Little Rock, AK	October 14
Miami, FL	September 29
Moncton, NB	October 12
New Orleans, LA	September 29
New York, NY	October 12
Norfolk, VA	September 28
Omaha, NE	September 29
Philadelphia, PA	September 28
Phoenix, AZ	October 12
Portland, ME	October 12
Raleigh, NC	October 13
Richmond, VA	October 11
Roanoke, VA	October 12
Sacramento, CA	September 27
Salt Lake City, UT	September 27
San Jose, CA	October 18
Savannah, GA	September 29
Seattle, WA	September 29
Syracuse, NY	October 20
Toledo, OH	September 27
Tucson, AZ	September 28
Tulsa, OK	October 11
Wilmington, DE	October 18
Winnipeg, MAN	September 28

To reserve a place call Harry Merkin at (617) 329-7700. Or simply complete and return the coupon below.

If you'd like a system demonstration, ask about arranging a visit at our Westwood, Massachusetts headquarters.

I'm interested in attending a seminar on Cullinet's Database System

in (city) _____ on (date) _____

Name _____

Title _____

Company _____

Address _____

Phone _____

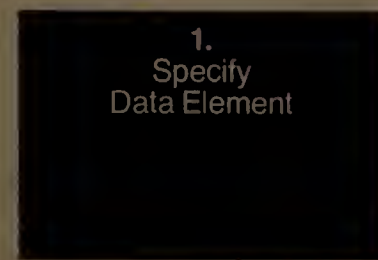
Operating Environment _____

Cullinet Software works with all IBM 360, 370, 30XX and 43XX computers — or plug compatible equivalent.

Cullinet Software, Inc., Corporate Meetings Department, 400 Blue Hill Drive, Westwood, MA 02090. 9/26/83 C'W

Their way.

Our way.



IDMS/R Automatic System Facility.

One database management system provides an Automatic System Facility for system development: IDMS/R.

Fourth generation languages, though excellent productivity tools, only address part of the system development task – namely, steps three and four as shown above. IDMS/R with Automatic System Facility, however, automates all of the steps necessary to develop systems. All you do is specify the data.

The Automatic System Facility dynamically builds the system.

It defines the database; creates screen formats; develops the applications; links the definition, screen and application together, then documents the system.

One DBMS using a powerful system development facility does it all. And does it all automatically. IDMS/R.

For more information on this unique facility, to attend a seminar or for a demonstration see the page adjacent.

Cullinet

© 1983 Cullinet Software Inc., 400 Blue Hill Drive, Westwood, MA 02090. 617-329-7700.

Conference Attendees Envision Decision Support

By Paul Gillin
CW Staff

CHICAGO — Users went to this year's Software/Expo with expectations of bigger 1984 budgets and visions of decision support dancing in their heads.

Asked how they expected next year's budgets to compare with 1983, several of the 10 users interviewed on the exposition floor here at the conference recently indicated that increases would be in the range of 25%, compared with 10% to 15% hikes granted this year.

However, several attend-

ees indicated that their budgets are likely to remain flat or increase only slightly over 1983.

Info Systems Rate High

Most managers who had money to spend at Software/Expo said executive information systems rated high on their wish lists. Manufacturing software was also a popular item in this industry-intensive region. And several users said they were casually checking out micro-mainframe links.

For Jerome Murray, director of management informa-

tion systems (MIS) at Rose Packing Co. in Barrington, Ill., "trying to find a way to focus management's quest for profit on specific means and then providing them with [information systems] support" was a major consideration.

Murray is seeking an environment in which computational tasks will be replaced by decision support. "We're trying to develop a situation where management doesn't just ask how many widgets we sold, but asks questions that will make that question obsolete," Murray explained.

to be 25% higher next year in preparation for conversion from Honeywell, Inc. to IBM hardware.

"A majority of people feel more comfortable with IBM, especially the president," he said. A mail order processing package was also on his software wish list.

Ozark Air Lines is planning a conversion to an IBM 3083 mainframe from its current 4341 and a major software conversion from DOS/VSE to MVS next year, Harodecki said. However, the DP budget is expected to rise by less than 5%.

A good data base manager and application generator will probably drive the hardware conversion at Intervarsity Press, Inc. in Downers Grove, Ill.

With a programming staff of two, the company "needs an application generator because it would be nice to do many new things without new people," said Steven Palmer, DP manager. His shop currently runs a Data General Corp. Nova minicomputer, but is interested "in finding a faster machine, something with more disk storage."

BUILDING A COMPUTER CENTER?

If you're planning a new expanded or remodeled DP facility, you need Datasphere's help.

Since 1968 Datasphere's unique combination of products and services has saved dollars, frustration and time for large and small firms around the world.

From turnkey—design/build computer rooms to the smallest support equipment, we'll do all or part—on schedule, within budget! Datasphere is unique—we're engineers, contractors and suppliers specializing in computer facilities.

Supplying a full line of support equipment, including:

- Uninterruptible Power Systems
- Computer Power Centers
- Computer Fire Protection Systems
- Computer Type Air Conditioning
- Gas Turbines/Diesel Generators
- Operation Command Centers
- Elevated Flooring
- Frequency Converters
- Line Filters
- Security Systems
- Systems Monitors
- Voltage Regulators

CALL DATASPHERE NOW!

800-221-0575

IN NEW JERSEY CALL: 201-272-1810

Write for additional information

 **datasphere, Inc.** 49 Meeker Avenue, Cranford, N.J. 07016

Create CICS Cobol programs and BMS maps that stand alone.

Send for information about PRO² today. Our product sells itself.

Name _____ Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Telephone (_____) _____ Operating System _____



Decision Point, Inc.
1199 Shoreline Drive, Suite 260
Boise, ID 83702 (208) 342-8766

Executive Decision Support

Executive decision support was also on the mind of John Harodecki, director of data processing for Ozark Air Lines in St. Louis. "We're looking for something executives in the corporation can use for financial planning, something they can use without getting into the computer." A mainframe spreadsheet was on his shopping list.

With a growing shop and a number of micro users around the company, Kevin Oswald, information systems manager at Peavey Co. in Chicago, was looking for micro-mainframe software.

He said a real-time link is not as important as IBM 3270 emulation in tying in to the corporate IBM 3083. Oswald was also looking for data base management software for the IBM Personal Computer.

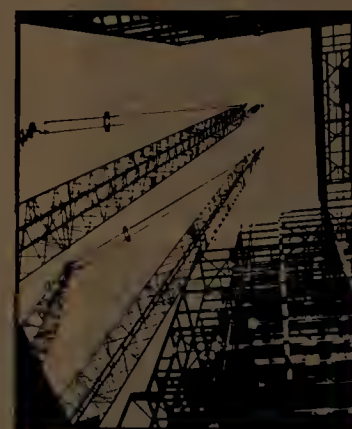
Several users were looking to automate further their manufacturing operations. "We're looking for order processing and in particular a total solution for manufacturing, but it's just not here yet," said William Keonig, MIS manager at Federal Mogul Corp.'s Ball & Roller Bearing Group in Detroit.

"We want a system to handle the way we do business. We shouldn't have to change the way we do business to accommodate our software," Keonig maintained.

Looking for Alternative

Inventory control, shop floor control, scheduling and eventually materials requirements planning were on the wish list of Jack Dalglish, data processing manager at Dover Corp.'s Rotary Lift Division in Madison, Ind. Having recently converted from an IBM System/3 to a System/34, Dalglish was looking for an alternative to IBM's Mapics.

Several other users said that 1984 would be the year of conversion in their installations. Lon Fornelli, director of MIS at GRI Corp. in Chicago, expects his budget



INTACT 50 Project Management Package

Fully integrated project controls for your cost, schedule and corporate financial systems.

Now, there is a complete project management system that gives you more responsive control over all project information:

- fully integrated job cost/project schedule/corporate financials
- modular design for flexibility to suit current and future needs
- flexible, user-tailored options to shape the system to your business requirements
- versatile enough for any size or number of projects
- interactive, on-line processing
- integrated data base for most efficient data management
- designed for all Prime 50 Series computers

Select from any of these powerful software systems:

- TRACK 50 Project Scheduling and Network Graphics
- Project Accounting/Cost Evaluation (PACE)
- General Ledger with Budgeting
- Payroll/Personnel with Labor Distribution
- Accounts Payable with Purchase Order
- Accounts Receivable
- Fixed Assets with Equipment Billing
- Performance Measurement Report Generator

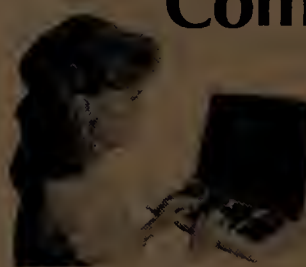
Write or call our Marketing Coordinator today for our free color brochure.



Dept. W9 1100 Eisenhower Place, Ann Arbor, Michigan 48104
Tel: (313) 973-1900 • Telex: 8102236048 • 8102232403

DATAPoint COMPATIBLE CRT DATAPoint COMPATIBLE CRT

The Datapoint Compatible CRT



KIE-3682
\$995

The Intelligent Choice

Today the intelligent Datapoint[®] user is demanding the KIE-3682. Why? . . . Because of the performance, economy and the service. Some of the standard features of the KIE-3682 are self diagnostics upon power up, printing from the screen directly to a serial printer, and displaying all control codes passed to the terminal. The KIE-3682 recognizes all DATABUS[®] software commands, and also enables the user to take advantage of Datapoint's[®] 5 function keys. An on site service contract is available through Western Union. The KIE-3682 carries a full 12 month factory warranty.

With all of the performance, economy and service, you can see why the intelligent Datapoint[®] user relies on the KIE-3682. Call today for more information, and be sure to ask about our 30 day, no risk plan.



113 East Columbia Drive
Kennewick, Washington 99336
509 582-5156

Datapoint and DATABUS are trademarks of the Datapoint Corporation.

COMPATIBLE CRT DATAPoint COMPATIBLE CRT DATAPoint COMPATIBLE CRT

DATAPoint COMPATIBLE CRT DATAPoint COMPATIBLE CRT DATAPoint COMPATIBLE CRT

Tech Should Take Back Seat to User Issues

Exec Urges Shifting Focus in DBMS Purchase

By Paul Gillin
CW Staff

CHICAGO — Whereas the criteria for selecting a data base management system (DBMS) were 90% technical as recently as three years ago, the emphasis today must be on solving specific problems, with technology taking a back seat to user issues. DP managers must also deal with the ubiquitous concern of whether to put DBMS on microcomputers rather than on mainframes.

That was the thrust of a presentation by J. Chris Wood of National Management Systems Ltd. of Alexandria, Va., at the Software/Expo conference held here recently.

Wood said that technical issues should constitute "no more than 30%" of the DBMS selection criteria in business today. However, many managers continue to rely on bells and whistles to make this expensive decision, he said.

"A DBMS is not everything to all people, and you can't find the perfect package," he said. "The question is how to find the best package for you."

When you boil it down, "99 out of 100 users want a DBMS basically for one application," said Wood, a former Cullinet Software, Inc. salesman with more than 10 years of data base experience. "First we should come up with how big this problem is: gigabytes or megabytes, batch or on-line?"

Choosing a batch vs. an on-line DBMS is a crucial and expensive decision, Wood said. "Think very seriously about the question of on-line update because it's very expensive," he noted. "Batch is cheap, but you've lost the ability to get at that information quickly. Whether you need a decision now or can wait until the next morning is a big consideration."

Often-Overlooked Factor

Another often-overlooked factor is ease of update, Wood said. Industries that are subject to government policies or frequent price and volume changes are better off with a flexible DBMS. "If you're controlled by any kind of law, you should seriously consider the static vs. dynamic question," he said.

For example, changing a field or record length can be extremely difficult with hierarchical or network models, he said. Relational DBMS are ideally suited for on-line access and modification but can slow down during times of heavy use. However, falling hardware prices and rising people prices are making the relational alternative more attractive, he indicated.

Among the technical issues to be considered are the scope of the data dictionary; access methods ("I don't think anybody has to process in a sequence any more," he said); interfaces to existing report writers and other utilities; and security and recovery provisions. "There's no limit to how much you can spend on this [last factor]," he said, "so you have to make a trade-off. You have to ask what would happen if you lost an hour's worth of work forever. How important is recovery?"

Ease of use is an increasingly vital area that "people don't look at very hard," he noted. DBMS users include data base designers, application designers, systems integrators and enhancers, programmers, end users and a category he called "sophisticated end users." Their needs are all different, and choosing a DBMS involves balancing their wishes with the problem the software is intended to solve.

Data base designers need a data dictionary, automated tools, statistical capabilities and graphics, he said. Application designers need a set of tools for mapping the application problem, prototyping facilities and

products that eliminate as much coding as possible. "We want tools to get things up quickly with minimal effort, and I don't care if it's inefficient," he said.

Systems integrators and enhancers who make changes to existing software need a flexible DBMS structure. In this case, "systems with physical pointers are extremely difficult to enhance because you have to unload and reload the entire data base," Wood said. Conversely, "Here's where relational and non-structured systems shine," he stated. "If you add a field to a record it takes five seconds. With [IBM's] IMS and [Cullinet Software's] IDMS, you've

got reload problems."

Sophisticated end users "love to prototype, get at some data and do some little reports," he said. They want report writers, ad hoc query languages and English-language programming languages. Most end users, however, want simple, menu-driven formats. "If they have to hit more than three keys to do something, they think it's a bad system," Wood noted.

Microcomputer DBMS have sparked a lot of interest as an alternative to an expensive mainframe package, but Wood warned that "there are tremendous problems that are just beginning to be solved."

INTRO
HOLOS
LASER
PRINT

- 28 Pages Per Minute
- Letter Quality Printing With 300 Dot Per Inch Resolution
- Economical Plain Paper Printing
- \$11,995 with OEM quantities under \$6,000

GO
general optronics corp.

Two Olson Avenue, Edison, N.J. 08820
Tel. (201) 549-9000 • TWX 710-997-9556

☐ Send Literature ☐ Contact Mel Telephone No.

Name _____
Company _____
Address _____
City _____ State _____ Zip _____

I want to know more about the versatile
Holoscan 28 Laser-Graphic Printer.

To Foster Joint Research Ventures

Reagan Unveils R&D Antitrust Immunity Bill

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. —

The Reagan administration recently unveiled its expected legislation to provide greater antitrust protection for joint research and development ventures.

The National Productivity and Innovation Act of 1983 would, President Reagan said, eliminate the uncertainty about antitrust liability that has made corporations shy away from cooperative R&D arrangements. The bill is not as sweeping in its amendment of antitrust law as was first proposed a few months ago [CW, July 11]; it does, however, include changes to antitrust handling of intellectual property right laws in order to encourage commercialization of R&D results.

To foster joint R&D, the bill clarifies existing statutes to hold that such ventures are not by definition illegal. According to the Justice Department, this means courts could not condemn these ventures without first considering their potential benefits.

Limited Penalty

Most importantly, the bill provides that the joint ventures that have been fully disclosed to the Justice Department and the Federal Trade Commission would not be liable to treble damages or judgments for any antitrust damage they might have caused. The penalty would be limited to the exact damages plus interest.

With these provisions, the administration hopes to balance the need to foster joint R&D with the need many members of Congress feel ex-

ists to protect the business community from anticompetitive activities.

The bill would also eliminate the threat of treble damages in connection with intellectual property licensing. Here, too, courts would have to consider the pro-competitive benefits of such licensing and could not find them illegal per se. The bill also

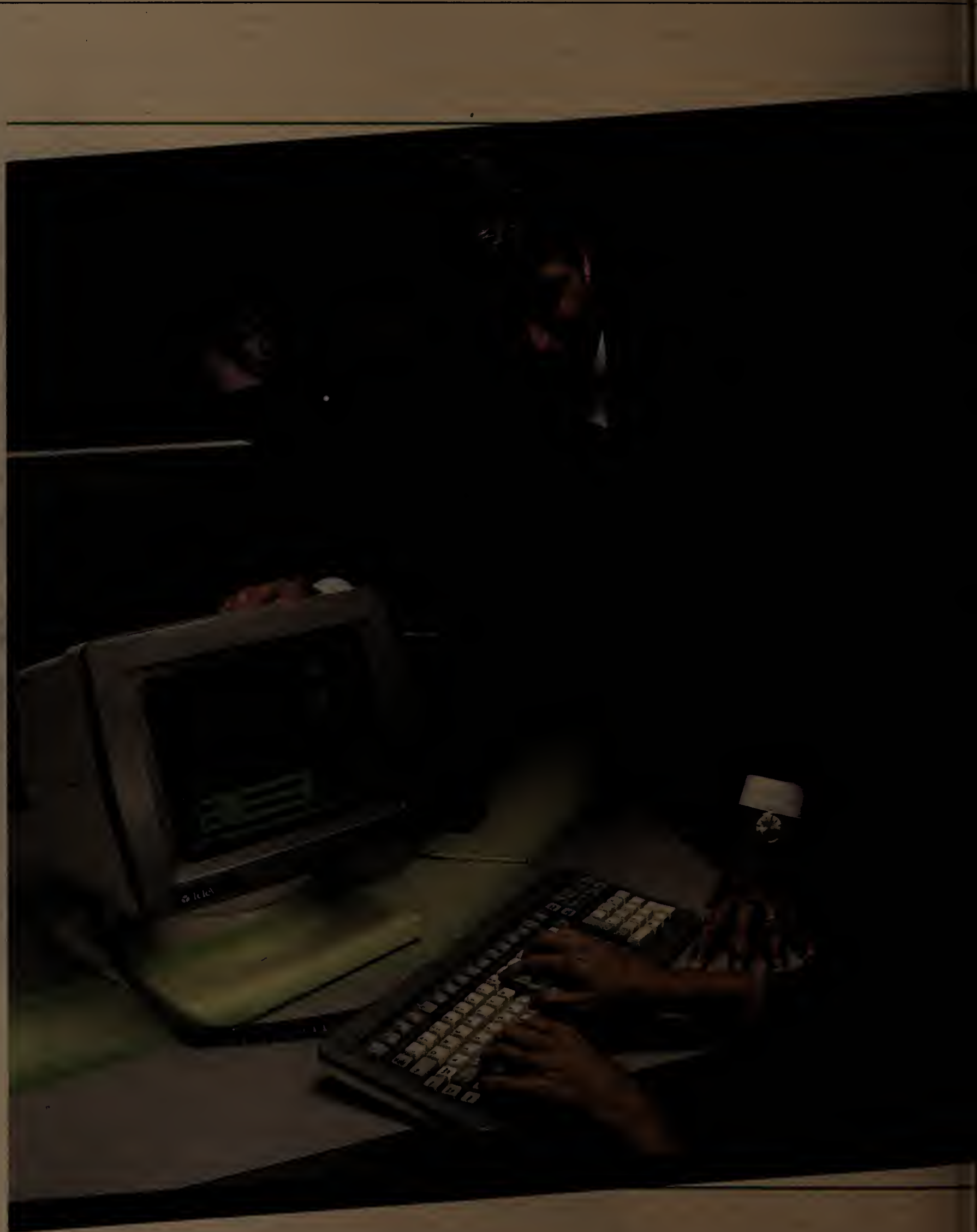
seeks to clarify the relationship between enforcement of antitrust laws and copyright and patent protection statutes.

Discussing the bill last Wednesday before the House of Representatives Judiciary Subcommittee on Monopolies and Commercial Law, Justice Department antitrust chief William F. Baxter said

the bill "sends a clear message that intellectual property enhances, rather than impedes, innovation and productivity and that antitrust enforcement must be appropriately sensitive to this fact."

The subcommittee is considering a number of legislative proposals to amend antitrust law. In particular,

Subcommittee Chairman Peter Rodino (D-N.J.) said Wednesday that the panel "will devote substantial attention to joint research and development." Hearings on that topic begin this week, at which time the subcommittee will receive a report from a private consultant hired to study the need for treble-damage reform.



Dema Meet Set for Oct. 17

SAN DIEGO — The Seventh Annual Conference and Equipment Exposition, sponsored by the Data Entry Management Association (Dema), has been scheduled for Oct. 17-19 at the Sheraton Harbor Island Hotel here.

Keynote addresses will be delivered by William G. Moore Jr., president and chief executive officer of Recognition Equipment, Inc., followed by Dr. Colin Fox Jr. and Dr. Tom McDade on "Socio-Technical Systems."

Registration fees are \$398 for members and \$454 for nonmembers. More information may be obtained from Dema through P.O. Box 3231, Stamford, Conn. 06905.

Additional CPU Saves N.Y. DGS Time, Money

By Lynn Haber
CW Staff

NEW YORK — If time is money, then the recent acquisition of an additional mainframe computer by the computer service center at the city of New York Department of General Services (DGS) is money well spent.

According to Deputy Commissioner Joseph A. Giannotti, the DGS's 1982 investment in an IBM 3081 has

already paid off substantially in time and cost savings.

"The 3081 is the most reliable computer currently on the market," Giannotti said. "In comparison to its predecessor, the System 370/158, the 3081 takes less than 80% of the space and only 40% of the cooling requirements.

Operates Faster

"It also operates five times faster. Because of this, we can

provide additional computing power at a reduced cost. We can now do more work for less money and in less time," Giannotti claimed.

The 370/158 system was saturated, according to the deputy commissioner, and DGS needed to do something to augment processing capability.

"Based on extensive planning and capacity analysis for present needs and pro-

jected growth, we concluded that we needed additional equipment, and the best performer for the department's requirements was the 3081," Giannotti said.

The decision to choose a higher priced system rather than a comparable product from a plug-compatible manufacturer was based on DGS's evaluation that the 3081 offered more options for future enhancements.

Just one year after installing the IBM 3081 Model D, the deputy commissioner said, the department is already studying the possibility of upgrading its current systems, which also include an IBM 3033 processor.

The IBM 3081 Model D at DGS has 16M bytes of main memory and 16 channels. An upgrade to the Model K with 32M bytes of main memory and 24 channels is being considered. According to Giannotti, the DGS will either upgrade the 3033 or replace it with another 3081.

Currently the computer service center has 500 terminals in various locations throughout the city. The DGS's investment in the 3081 has proven beneficial not only in terms of cost efficiency, but also in helping the city provide valuable services to New Yorkers.

Among some of the city agencies that utilize the resources of the computer service center are the Division of Real Property, the Law Department, the Parking Violations Bureau and the Department of Health's Vital Records Division.

According to Dave Chester of the Health Department, information is now more quickly available. "The 3081 has cut the time from 20 to 30 minutes to two to five minutes," Chester said.

UT Board Approves Tech M.S.

AUSTIN, Texas — The System Board of Regents for the University of Texas (UT) in Tyler authorized a master of science degree in computer science during a recent meeting here. The degree is designed to prepare students to become computer science professionals.

The degree program, which must be approved before implementation by the Coordinating Board, Texas College and the University System, will offer course work in the areas of software development and methodology, computing theory, computing applications and research methods and techniques.

According to George F. Hamm, president of the university's Tyler branch, the new degree will essentially be an extension of the computer science courses presently offered through the M.S. degree program in interdisciplinary studies.

More information is available from the University of Texas System, Ash 724 201 W 7, Austin, Texas 78701.

THE NEW 924. THE TELEVIDEO SUCCESS STORY CONTINUES.

From the time it was founded, TeleVideo has combined the best innovations in technology, design and quality of manufacturing to bring you a superior terminal. Now with the new 924 we've built in comfort and productivity features that leave the other manufacturers in the dark. The result is everything you've wanted in an advanced terminal.

The 924 is comfortable, with a tilt and swivel non-glare screen. Its lightweight, low profile keyboard fits your fingers naturally. Our 32 programmable, non-volatile function keys turn often used instructions into simple one button commands to maximize your programming throughout. Extra display features include full screen editing, character and block graphics, definable scrolling regions plus 32 character-by-character visual attributes.

There's more. The 924's logical attributes define protected and unprotected regions for maximum efficiency and accuracy in down-loading forms. And, standard one-page or optional four-page memory gives you plenty of off-line work room.

If you don't need the full power of the 924, try our 914. It has all the design advantages of the 924 and is the superior terminal in its own class. It just costs less. And like all TeleVideo terminals, both are backed nationwide by General Electric Instrumentation and Computer Service Centers.

Whatever your application, in terms of reliability, serviceability, performance and price, nothing measures up to TeleVideo. And nothing succeeds like the 924!

Call us at (800) 538-8725 for more information (in California call (408) 745-7760) or contact your nearest TeleVideo office:

California/Santa Ana	714-557-6095
California/Sunnyvale	408-745-7760
Georgia/Atlanta	404-399-6464
Illinois/Chicago Area	312-151-9350
Massachusetts/Boston	617-668-6891
New York/New Jersey	201-267-8805
Texas/Dallas	214-980-9978
United Kingdom/Woking, Surrey	44-9905-6464



TELEVIDEO TERMINALS

TeleVideo Systems, Inc.

To Reduce Reliance on State CPU

Maryland Branch Employs Micro to Draft Bills

By John Gallant
CW Staff

ANNAPOLIS, Md. — In an effort to improve response time and reduce costly reliance on the state's mainframe computer, the computer division of the Maryland Legislative Services Branch here has embraced a plan to employ a microcomputer system for a bill drafting in the upcoming legislative session.

According to Joseph Hopkins, assistant director of the computer division, the state legislature has purchased a turnkey microcomputer system developed by Data Retrieval Corp. of Milwaukee, which will link the state's IBM 3081 Model G main-

frame with the microcomputer system through a local-area network.

The Data Retrieval Micro-Mainframe System includes the company's management information processing software and two Intel Corp. ITPS 86/445 transaction processors, each of which can support up to 10 terminal users.

"With this system," Hopkins said, "we can conceivably just use our mainframe for mass data storage in the future and do all our bill drafting on the micros."

Currently, each of the computer division's approximately 35 data input operators, who work on Hazeltine Corp. Espirit II terminals, utilize

a local-area network to access the mainframe, which is located about a half mile away at the state comptroller's office. The computer division spends approximately \$30,000 monthly to rent time on the mainframe, according to Hopkins.

Because other state agencies such as the income tax division, the payroll department and the court system also rent time, response time has been a problem.

"The main reason we purchased this system is to improve response time. We aren't the only users of the state computer. A lot of other divisions are also vying for time. Therefore, the response time is slow, some-

times as long as a minute or more. It's very frustrating. The slow response time really breaks up the rhythm of our data input people," Hopkins said.

The mainframe runs Data Retrieval's Automated Legislative Text Entry and Retrieval (Alter) software system, which allows users to input a legislator's proposed bill, revise it with amendments and language changes and update the status of the draft as it passes through both the Maryland House and Senate. The data base also contains the state's entire statutory code, which is updated when an approved bill is signed by the governor.

RS/1TM The Research System

The Foundation of a Great Relationship

Data Processing Manager

I used to spend days-even weeks writing and rewriting applications to fit a researcher's needs. And neither one of us was happy with it. But now I have a package that he can use himself, freeing me up for major new systems.



Scientist

I used to wait forever to get my data out of DP. With RS/1 though, I have control. I can get statistics, graphics, and models easily by manipulating data myself, and I get it done right. RS/1 can help me find the breakthrough that's hidden in my data.

RS/1, The Research System is software that brings relief to the DP department. And results to scientists and engineers. A win/win situation.

With 150 person-years of development behind it, RS/1 is a mighty tool for research. Thousands of users—in hundreds of installations—already enjoy its speed and productivity.

RS/1 gives researchers the capability to do their own high-level data processing—without having to go through the DP department; and without having to write their own programs. RS/1 saves days, weeks, sometimes months, in working out problems.

RS/1 gives DP professionals an interactive program development environment with access to RS/1's high-level statistics, graphics, and DBMS so they can

customize RS/1 to suit specific needs.

Commands are entered in the most natural—and efficient—terms. For example, the simple command: "MAKE GRAPH" is all that's needed to take tabular data and produce what's needed on the screen. Also, RS/1 anticipates research needs; it's structured to display data in formats immediately useful to scientists and engineers.

RS/1 runs on Digital's VAXTM and PDP-11TM computers. In fact, Digital has accepted RS/1 in their external software library as a standard package for laboratory data analysis, graphics, statistics and modelling.

RS/1, The Research System. For Relief. For Results.

Bolt Beranek and Newman Inc.

Software in support of scientists and engineers

BBN Research Systems—10 Moulton St., Cambridge, MA 02238 (617) 491-8488

VAX and PDP-11 are trademarks of Digital Equipment Corporation. RS/1 is a trademark of Bolt Beranek and Newman Inc.

Work Load Reduced

The bill drafting system, which has been computerized for eight years, has reduced about three-quarters of the division's work load, Hopkins said.

According to Hopkins, the computer division plans to transfer the Alter software to the Intel transaction processors, allowing the division to perform the bill drafting and status functions without accessing the mainframe.

The division has estimated that the microcomputer system, which is scheduled to become operational in time for the January 1984 legislative session, will reduce the cost of renting time from the mainframe by 15% during the first year of operation. By gradually phasing out reliance on the mainframe, the division hopes to cut costs by up to 75% during the 1985 legislative session.

The entire package was purchased from Data Retrieval for about \$230,000, according to Hopkins. Also, Intel is developing software for a local-area network that will facilitate communication between the two transaction processors, each of which is equipped with a Winchester tape drive. Each system has 84K bytes of memory, which the division plans to double by next year.

Even when the microcomputer system becomes fully operational—a process that will take at least three years, according to Hopkins—the division will not be completely independent of the state's mainframe.

Because each of the transaction processors can only support 10 terminals, additional users will continue to access the mainframe via the Intel system, he noted.

Deltak Offers Training Series

NAPERVILLE, Ill. — Deltak, Inc. is offering an eight-part multimedia training series for program designers and project managers.

Called Structured Design, the series explains the basic methods of structured design, including coupling, cohesion and its relation to other structured techniques.

The series runs between 19 and 27 hours and rents for between \$50 and \$125/mo. It can also be purchased for \$1,750 from Deltak, 1751 W. Diehl Road, Naperville, Ill. 60566.

XEROX

Even the most sophisticated experts are impressed with our unified software system for manufacturers.

"The software is excellent. There is nothing else like it on the marketplace."

"Integrated application packages, fourth-generation languages and program generators (are) combined together in a fashion which is unique today."

"The integrated architecture is excellent. The degree of integration is unique."

"An Integrated Decision Support System. Who else has this? Nobody!"

—From a James Martin Seminar

No wonder.

Its unique architecture makes it the only system in the world that completely integrates business applications software, personal computing, information center products, decision support systems, a data-base manager and fourth-generation languages.

And its single, unified configuration allows data to be managed without special programming, through the facilities of a common information exchange to translate the data from one processing environment to another.

Business Computing

With the Xerox Manufacturing System, every department can work with information stored in the same dictionary-defined corporate database.

This transaction-based system includes 17 fully-integrated business applications. So that manufacturing, finance, marketing, distribution, engineering, procurement and planning can all base decisions on the most current situation with on-line, real-time access.

Because master scheduling, MRP II, inventory, order entry, costing, production control, procurement, receivables, payables, financial modules and a new repetitive manufacturing application are combined in the most powerful operating management tool available today.

And that's with complete portability across all IBM SSX, VSE, VSI and MVS operating systems. Without changing the software.

Personal Computing

Personal computers with CP/M or PC DOS operating systems can be host-connected for personal applications, spreadsheet programs, word processing and printing/graphics capabilities.

So your end users can capture data from business applications to help them plan and execute priorities.

Information Center Computing

With our fourth-generation language, end users can write their own applications and let you clear up your programming backlog. Integrated decision support systems provide easy-to-use programs for budgeting, financial planning, and general problem solving, all using information from either the primary or other databases.

Easy to Implement

We can configure a system that's yours alone. One that matches your data processing needs today and will grow with you tomorrow.

Use it on your IBM computer or, as an option, start with the software on our timesharing service. Then, when you're ready, move the software and database in-house. In one weekend.

Or, if you need a computer, we'll install a complete turnkey system with Xerox software and IBM or Digital hardware.

With You All the Way

Your system is backed by a professional organization that understands manufacturing. We've installed computer-based systems in more than 800 manufacturing plants.

Implementation support, consulting and education services are available from 20 Xerox offices in the United States and Europe.

For more information, call toll-free (800) 323-2818, Operator 148. In Illinois, call toll-free (800) 942-1166. Or, return this coupon for a copy of the new *Xerox Manufacturing System* brochure describing our advanced software architecture.

We think you'll be impressed, too.



Xerox Computer Services

c/o Ron Rich, 5310 Beethoven Street, Los Angeles, CA 90066. Send me a free copy of the *Xerox Manufacturing System* brochure. I want to know more about your advanced software architecture for:

☐ IBM 43XX ☐ IBM 370 ☐ IBM 30XX ☐ Digital VAX

Name/Title _____

Company _____

Street _____

City _____ State _____

Zip _____ Phone () _____

XEROX® is a trademark of XEROX CORPORATION.
Digital and VAX® are trademarks of Digital Equipment Corporation.
IBM® is a trademark of International Business Machines Corporation.

CW 9/26/83



Wide World Photos

After the NFL, Frank Tarkenton threw some passes for MSA...

By Peter Bartolik
CW Staff

Whether you call them television spokesmen, personalities or just plain stars, well-known faces with box office appeal are turning up with increasing frequency to tout computer products.

William Shatner of *Star Trek* fame beams out from a Commodore Business Machines, Inc. commercial for home computers. Bill Cosby wants everybody to get in on Texas Instruments, Inc.'s \$100 rebates and free speech synthesizers. Alan Alda stitched a deal a couple of months ago to represent Atari, Inc.

The reasons for using well-known members of the entertainment professions vary with the vendors when

Media Stars, Athletes Bring Computers to Living Room

it comes to selling to the growing retail market.

"We wanted somebody sophisticated and friendly who would appeal to our demographic target — Dick Cavett fit that mold," Stan DeVaughn of Apple Computer, Inc. recently recalled about the company's television campaign that began in 1981. Apple, which aggressively took the lead in sales of personal computers priced over \$1,000, was after the "up-scale" customer who is, "as a rule, college-educated with discretionary income; somebody equally comfortable going to the theater as to a sports event," DeVaughn said.

The use of personalities does not stop at the television screen, however. And sports figures seem to be making inroads upon this sophisticated market.

Former Minnesota Viking quarterback Fran Tarkenton, now a broadcaster for ABC, was a trend setter in the mid-1970s when he appeared in newspaper ads and lectured on productivity and management for Management Science America, Inc. (MSA), the Georgia-based software company. While MSA has no formal relationship with Tarkenton at the moment, the relationship "was marvelous for us," said John Imlay, chairman of the board. The series of 12 print ads were funny and dealt with human situations, said Imlay, a

close friend of the former athlete. The series, he believes, provided credibility and increased visibility for the company.

Former hockey star Bobby Orr, who returned from early retirement to become a business executive, recently was asked to join the board of directors of Cullinet Software, Inc. But there are no plans for Orr to take to the TV screen to sell software, according to a spokesman for the Westwood, Mass., company.

Orr, who is a consultant with Nabisco Brands, Inc. for sales promotion and sales motivation, may be asked to run some sessions with the software company's sales force. Reportedly a Cullinet shareholder, Orr also works as vice-president for sales with Pandick Press, Inc. in Boston. Coincidentally or not, Cullinet President Bob Goldman sits on Pandick's board, and Cullinet Chairman John Cullinane is reportedly an avid hockey fan.

Former pro football star Lance Rentzel is closer to the trenches with California-based Compucorp, Inc. In a recent interview, Rentzel said that his playing career can open doors for his new endeavors, but can also have some adverse effects (story on Page 49).

The growing acceptance of computer technology and the lure of retail revenues could result in greater emphasis on the use of personalities



... While Bobby Orr exchanged the NHL's boards for Cullinet's.

to sell sophisticated equipment. With an increasing consumer thirst for computer equipment and aggressive vendor battles for a share of the marketplace likely to erupt, promotional campaigns are sure to be a factor in tapping what many experts believe to be a vast potential market.

But Apple's DeVaughn sees a need to go beyond the TV spokesman and scoffs at competitors still gearing up for that aspect. Apple will not be using Cavett in its next campaign, DeVaughn said.

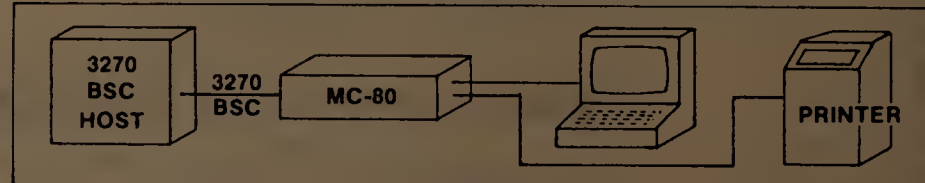
"Public awareness has caught up to technology," DeVaughn said. "We've gone beyond the point of making people aware about personal computers; [audiences] have to be shown what can be done with them."



Take my system... please, quip comedians Alan Alda (l) and Bill Cosby.

3270 BSC USERS...

LOW COST SOLUTION AVAILABLE FOR DEC VT100, TELEVIDEO & IBM 3101 TERMINAL USERS WISHING TO LINK WITH AN IBM 3270 BSC HOST.



INNOVATIVE'S ONE OR TWO PORT EMULATOR APPEARS TO THE IBM HOST COMPUTER AS A 3271-1,2, 3274-51C, 3276-1,2 WITH A 3277/3278 TERMINAL ATTACHED.

- Dial up support to 3270 Systems
- Extensive self diagnostics

- Data rate up to 19,200 BPS
- One Year Warranty

- Modem sharing option

Customized software for other ASCII terminals may be required. We suggest a phone consultation with our technical department.

Innovative™
network data communications

Starting at **\$1495**

1-800-327-3955
1-305-624-1644

INNOVATIVE ELECTRONICS, INC. 4714 N.W. 165th St., Miami, FL 33014
DEC, TELEVIDEO, IBM ARE REGISTERED TRADEMARKS

SOURCE PROGRAM MAINTENANCE UNDER CICS!

Make Your Solution The One That Playboy, ITT Financial and Others Found So Productive.

Some of the major features of SYSD are:

- Full screen PDS editor
- SPOOL Display
- SPOOL print to 32XX printer
- Automatic and selective printing
- Standard FCB forms control
- Job submission and status displays
- Data set utilities
- Low overhead
- VS1, MVS, CICS

Here's Three Good Reasons Why You Should Call Today:

- 30-day free trial
- SYSD is site licensed at \$8,500
- SPOOL display/print (H&W's CPMS™ component) is licensed at only \$5,880

CALL:
(208) 377-0336

H&W
COMPUTER SYSTEMS, INC.

H&W Computer Systems, Inc. P.O. Box 4173, Boise, Idaho 83711

CICS Solutions

Sports Fame Opens Doors In Business, But Casts Shadow

By Peter Bartolik
CW Staff

WASHINGTON, D.C. — Lance Rentzel, a former professional athlete who now represents a computer company, found that fame earned on the playing field can open doors in a second career, but can also overshadow new accomplishments.

Rentzel played 10 years of professional football, starring as a wide receiver for the Dallas Cowboys and the Los Angeles Rams. Retired from the game in 1975, he recently was flooded with requests for personal interviews after the Associated Press reported on a computer leasing deal he had put together for his employer, Compucorp, Inc.

"I was flattered that people remembered me as a player, but I feel the focus should be on the company and what we've accomplished," Rentzel told *Computerworld* recently.

GOP Deal

Compucorp, based in Santa Monica, Calif., will provide an automated information system to the national Republican Party for use both on the floor of next year's convention and during the subsequent presidential campaign. As director of government relations for the company, Rentzel conceived and finalized the deal.

Compucorp will lease the GOP its 700 series stand-alone word processors, along with an "ambitious" networking system and new database management software. The company's Omega Mite, a 260K-byte transportable computer, will also be included.

The system will provide everything from hotel room information for convention delegates to battle commands on the floor of the convention to campaign scheduling information. The equipment is on a reduced-rate lease plan, according to Rentzel, but is "not an out-and-out donation."

Rentzel spent several months with Compucorp "just learning the ropes" before he came up with the political campaign idea after a friend visited the White House. "The political arena had never really used this type of tool," he said, adding that it took six or seven months to cement the pact.

Info Trends Theme of Show

TORONTO — "Info-Trends: Insights for Strategic Planning" is the theme for the 1983 Canadian Computer Show Conference to be held here at the International Centre Nov. 14-17.

The focus throughout the four-day conference will be on the impact of technological change, with special emphasis given to a global perspective and telecommunications.

The cost is \$85 per day (\$75 for Canadian Information Processing Society [Cips] members), and a special rate is available for individuals registering for all four days.

Further information is available from Cips, 243 College St., Toronto, Ont. M5T 2Y1.

Employed at Compucorp for 15 months, Rentzel's football background "enabled me to know people at high levels, and that gets you in the door." Once in the room, however, "I have to deal on a normal basis. If I can't perform, I have no business being there."

A few people seem to think his football background automatically excludes business acumen, he said, even though he has a master's degree in mathematics.

"It's a slight thing I've probably had to overcome. Once I'm able to bring in a system and show them I can do more, I think I earn more credibility," he said.

VM SUPPORT



When it comes to productivity-oriented products that support VM-based systems...Adessa has them!

- Archival Storage Subsystem
- CMS Read/Write OS DASD Support
- Electronic Conferencing Facility
- Enhanced Page Migration
- Extended Console Support
- Online Performance Monitor
- Single System Image Facility
- System Resource Manager
- Terminal Simulation Subsystem

Call or write for additional information and a complimentary subscription to our VM newsletter, *The Adessa Advantage*.

The Adessa Corporation

P.O. Box 515, Ridgefield, Connecticut 06877 • (203) 431-3071

- Program Products • Consultation • Contract Programming
- Education • Performance Analysis • Remote Support



For business modeling, forecasting and analysis, use

FCS-EPS

The choice of professional planners around the world

For the business planner, using FCS-EPS begins with Business English the FCS-EPS language. It's so close to spoken English you'll be pleasantly surprised. With it, simple models may be developed after less than two hours training. Yet, it is so powerful, it can handle the most complex models. FORTRAN subroutines are gone forever.

Hierarchical consolidation, full color financial graphics, merger acquisition analysis, relational database management... FCS-EPS provides these and many other tools needed to solve the toughest decision support tasks, and all with system efficiency that won't impact tightly-scheduled minis and mainframes.

FCS-EPS is available for most mainframes, minis and micros and is fully supported around the world.

Contact EPS today about the FCS-EPS decision support solution. Ask for your free copy of "Selecting and Evaluating a Decision Support System" and learn why FCS-EPS is the choice of planning professionals around the world.

 **EPS**

One Industrial Drive
Windham, NH 03087
603-898-1800

NORTH AMERICA Atlanta (404) 911-1988 • Chicago (312) 773-4888 • Cleveland (216) 224-8440 • Dallas (214) 631-0968 • Houston (713) 771-0618 • Los Angeles (213) 827-8961
New York (212) 561-5606 • San Francisco (408) 292-6211 • St. Louis (314) 851-9414 • Tampa (813) 962-3528 • Toronto (416) 279-8711 • Montreal (514) 631-2090 • Ottawa (613) 234-1414
Washington (202) 941-4862 • Calgary (403) 234-1785 • Vancouver (604) 669-4250 • Mexico City (905) 539-2286 • INTERNATIONAL London (01) 579-6931 • Brussels (02) 3470740
Rotterdam (31) 898-0006 • Caracas (49) 2203 2111 • Basel (061) 217 72 • Paris (1) 321 6457 • Milan (02) 688 6960 • Oslo (02) 67 50 64 • Caracas (58-2) 781 3366 • Lima (51) 416708
Buenos Aires (01) 2712 • Santiago (56) 284 008 • Sydney (2) 439 3722 • Tokyo (3) 437 0654 • Madrid (91) 440 0088

System Enables Customers to Bank From Home

By Peter Bartolik
CW Staff

WASHINGTON, D.C. — The need to maintain a "one-to-one relationship" with customers while adapting to technological advances has resulted in development of a direct-connect home banking system for customers of the Madison National Bank here.

With about \$250 million in assets, the bank has 10 branches within its 62 square-mile service area, but many customers live outside the district in either Maryland or Virginia. It became apparent several years ago that the bank would need a convenient form of funds transfer in order to be competitive, according to George Keyser, vice-president for data processing.

Automated teller machines (ATM) were one obvious area for development, and home banking seemed to be another likely area to consider, he said.

Madison National recent-

ly began offering its customers a system that utilizes Commodore 64 home computers from Commodore Business Machines, Inc. to access accounts and transfer funds within the bank computers; an on-line brokerage service is planned. The Home Teller service was first announced in April, and field tests with a "friendly customer base" began in June.

Those customers willing to sign a 36-month agreement, pay \$15 a month and maintain a \$1,000 minimum balance will be provided with Commodore's computer, 1541 floppy disk drive and modem. Customers already owning the Commodore 64 pay a reduced monthly fee.

Customers are able to phone in and have their computers communicate with a Digital Equipment Corp. PDP-11/24, which can answer up to 16 lines at a time. The PDP-11/24, which Keyser called "the traffic

cop," communicates with an IBM 370/145 through a Peripherals Corp. T-Comm 80 processor. The IBM 370/145 is basically assigned to handle all on-line services, including ATMs and Home Teller, Keyser said, while an IBM 370/148 is assigned to other bank functions.

The Home Teller software used on the Commodore and the conversion software used on the PDP-11/24 were developed by Intermetrics, Inc., the Cambridge, Mass.-based software company that is a prime developer of the Ada programming language. Madison National and Intermetrics entered into "somewhere between a partnership and a joint venture" to market the software, according to Keyser.

Evaluated Systems

When a decision was made to seek a home banking system, Madison National evaluated systems "pretty much in their infancy" at banks in New York, California and Knoxville, Tenn., Keyser said. But, "No one had it designed the way we thought it should be done."

Keyser designed the system configuration, and software development was put out to bid. Intermetrics bid on the system, but eventually a joint arrangement was reached. Madison National provided the banking expertise, and Intermetrics brought the world of microcomputers "to a supermini-to-mainframe-oriented industry," he noted.

A direct-connect service was desired, according to Keyser, because it offers "the one-to-one relationship our customers are more comfortable with." It also avoids a third-party billing system that the bank could not control. Banks tend to shy away from third-party arrangements because they are "semiparanoic about third parties processing financial data," he said half jokingly.

The bank wanted control over security aspects, he added. In addition to sign-on codes and encryption, the system has a program to prevent release of data to an intruder using a random number program generator. "We've learned from ATM technology some additional security tricks," Keyser said. "We believe our security is adequate at this point."

At the moment, the system can handle up to 1,000 customers and could double that capacity with a new high-speed modem Commodore is developing, according to Keyser. Plans call for the eventual replacement of the PDP-11/24 with one of the DEC VAX family of su-

perminicomputers. "The bottom line is the ability to buffer transactions," Keyser said.

According to Glenn Schickler, vice-president of marketing, customers can pay up to seven bills per month using the system, and that will double at a later date. Nearly 100 department stores, credit card companies and other businesses have indicated their willingness

to participate. The bank is also initiating a discount brokerage service in November that will be accessible to Home Teller customers.

Madison National and Intermetrics also plan to market the software to other banks, Keyser said. Software is already under development for use with VAX computers and also for Atari Corp. home computers.

DECsystem-10/20 Users...



Mainframe Modeling at a Micro Price

- BBL II+ is a true decision support language, not a spreadsheet package
- Self-documenting models that look and read like English
- Easy to learn and use, yet incredibly powerful
- Delivered with superior documentation — installs in minutes
- BBL II+ "Starter Kits" cost just \$95, including complete BBL II+ documentation, the BBL II+ application library and a 90-day trial copy of the BBL II+ system

If you own or use any standard DECsystem-10 or DECSYSTEM-20, you can finally get the mainframe modeling system you need, at a price you can afford... just \$2950! Prove it for yourself with a BBL II+ "Starter Kit". Call or write today for complete details.

BBL II+ Available Now... Just \$2950⁰⁰

DECsystem-10 & DECSYSTEM-20 are trademarks of Digital Equipment Corporation

BBL II+

Core & Code, Inc.
3 Winding River Circle, Wellesley, MA 02181
(617) 237-4554

PROFESSIONALISM IS A COMMITMENT CERTIFICATION IS THE TEST

The Institute for Certification of Computer Professionals (ICCP) has scheduled the **1983 CERTIFICATE IN COMPUTER PROGRAMMING (CCP)** Examination for December 10 at test centers throughout the world. Designed for experienced programmers, the examinations are constructed

to measure knowledge in each area of specialization — business, scientific and systems programming

Application deadline is October 15. Give yourself sufficient time to review your knowledge by sending in the coupon today

Send "Certificate in Computer Programming Examination Announcement and Study Guide," including application, test site list, exam content bibliography, and Codes of Ethics, Conduct and Good Practice

Also send information on Certificate in Data Processing (CDP) Examination published May 6, 1984



Name

Street Address

City

State/Province

Zip Code

MAIL COUPON TO:

Institute for Certification of Computer Professionals
Certification and Testing Section
7500 Old Oak Boulevard, Cleveland, OH 44130

CW 31

PC 2622



A COMPLETE EMULATION OF THE HP 2622A
FOR THE IBM PERSONAL COMPUTER

FEATURES:

- V/3000 FULLY SUPPORTED
- ALL HP 2622A ESCAPE SEQUENCES
- TESTED ON COLUMBIA, COMPAQ, EAGLE, & CORONA PC COMPATIBLES
- LINE DRAWING CHARACTER SET
- USES ALL AVAILABLE MEMORY AS DISPLAY MEMORY
- FILE TRANSFER AND TYPE-AHEAD
- PRINTER FUNCTIONS: LOGGING, COPY LINE, COPY PAGE, COPY ALL
- FULLY PROGRAMMABLE FUNCTION KEYS WITH ON-SCREEN LABELS
- BAUD RATES THROUGH 9600

\$295⁰⁰

**Walker Richer
& Quinn, Inc.**

LAKE UNION PLACE, SUITE 201, 1914 N. 34TH STREET
SEATTLE, WASHINGTON 98103, PHONE (206) 634-0503

Not Enthusiastic About Info Net

Bankers Seen Wanting Micro Tools

WASHINGTON, D.C. — Community bankers have indicated a strong demand for microcomputer software and less enthusiasm for a national on-line information network, according to the findings of an American Bankers Association (ABA) task force. The task force will further explore the development of software.

An eight-month pilot project to examine the feasibility of building a national on-line network for community banks was conducted by a joint task force composed of representatives from the ABA's staff, the Community Bankers Council, the State Association Division and outside technical consultants.

That task force recently presented four recommendations to the ABA leadership, which is expected to accept the findings:

- The ABA should not invest large financial and human resources required to build and maintain a major electronic information delivery system for what would probably be a limited and abbreviated market.

- The organization should develop and promote microcomputer software and supportive materials to fill the needs identified by the Community Bankers Council.

- The ABA should continue to explore electronic communications opportunities.

- The reasonableness of vendor-supportive systems to create a national data base should be investigated.

ABA spokesman Dan Buser said about 180 financial organizations composing the Community Bankers Council leadership group participated in the project.

Provided Access

Buser said that bankers were provided access to Source Telecomputing Corp.'s The Source for research data and general services and to another data service for stocks and bonds information.

Bankers "liked accessing on-line services when they were free, but when we switched over and charged line costs, we found there was not much need for it," Buser said.

It became clear, he added, that bankers would rather wait for their copies of *The Wall Street Journal* to peruse the stock market and call their local travel agents to make reservations than pay an access charge to receive similar information on-line.

Community banks have acquired microcomputer equipment, the task force

found, but need software pertaining to their industry that can be run on that equipment.

Bankers indicated a need for programs dealing with new savings plans, assets liability management and the like, according to Buser.

The task force will now focus attention on a Phase II project to determine the mar-

ket that exists for software and to explore possible relationships between the ABA and software vendors.

"We will work with companies that might like to be involved with us," Buser said. He anticipates such an arrangement would be "a shared risk" with the ABA and vendor sharing development costs.

INTRODUCING THE ENTIRE SELECTION OF MICROCOMPUTER LINE PRINTERS IN THE WORLD.

Now, for the first time, Printronix gives you the speed, power and reliability of its famous P-series matrix line printers in a microcomputer line printer—the MVP.

Until now, line printers have come in only one size: large. And they've been dedicated to large system tasks. Producing volumes and volumes. Day in and day out.

The MVP offers you that same dependability for microcomputers. With the MVP's unique Hammer-Bank technology, there's no need to change print wheels or adjust character registration. When other printers are ready to break down, the MVP's just warming up. It's the only microcomputer printer built to

take the pressure of high-duty cycle processing. Backed by the meanest mean-time-between-failure rate in the industry.

And the MVP hammers home superior print quality, producing crisp, uniform dots that overlap to form characters so solid, they're clear to the last copy of a multi-part form.

With selectable speeds, the MVP is truly the *most versatile printer*. Capable of "shifting gears" to give you just the output you need—from high-resolution characters at 80 LPM for word processing to compressed print at 200 LPM.

And using the MVP's flexible graphic capabilities, you can generate an unlimited range of customized logos, labels, bar codes, character sets and even draw your own comparisons—in pie charts, line graphs, 3-dimensional representations and much more.

The Printronix MVP. The business printer that really means business.

For more information, contact Printronix at 17500 Cartwright Rd., P.O. Box 19559, Irvine, CA 92713.

THE FIRST LINE IN PRINTERS.

PRINTRONIX

Outside California: 800-556-1234, ext. 66
In California, 800-441-2345, ext. 66



UniPress Reason No. 3

—UNIX for LISA—

UniPlus+ Full System III • Berkeley Enhancements

OTHER REASONS: EMACS Full Screen Editor for UNIX and VMS • Much more UNIX Software too.

For more information, contact:

UniPress Software, Inc.

1164 Raritan Avenue, Highland Park, NJ 08904
201-985-8000 Toll Free: 800-222-0550 (outside NJ)

Mastercard and Visa

UNIX is a trademark of Bell Laboratories
VMS is a trademark of Digital Equipment Corp.

Federal Ed Panel Pushes School Computer Use

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — A special education commission recently recommended a national program, costing the federal government \$1.5 billion the first year alone, to establish special math and science elementary and high schools, retrain teachers and increase student curricula in math and science, including computer science.

Declaring "America must not become an industrial dinosaur," the 20-person panel, brought together last year by the National Science Foundation (NSF), said "the nation that dramatically and boldly led the world into the age of technology is failing to provide its own children with the intellectual tools needed for the 21st century."

The panel's report, "Educating Americans for the 21st Century," was released here recently. Among other things, it called for more math and science education at all levels, from kindergarten through high school, including one semester of computer science for all students by the time they graduate from high school.

In its proposals for "sweeping and drastic changes" in precollege education, the report recommended a return to the "basics of the 21st century," which — besides reading, writing and arithmetic — should include communication and higher problem-solving skills and scientific and technological literacy.

The panel called these "the thinking tools that allow us to understand the technological world around us . . . By 1995, the nation must provide, for all its youth, a level of mathematics, science and technology education that is the finest in the world."

In the area of new information technologies, the panel noted the increasing use of computers in education. The panel went on to recommend that:

- NSF take the lead in evaluating the application of new technologies, supporting prototype demonstrations, disseminating information and supporting research on integration of educational technologies with the curriculum.

- States establish regional computer centers for teacher education and encourage the use of computers in the classroom for both teachers

and administration.

- Top executives in the computer, communications and information industries develop plans to enable schools to use the technology economically and soon.

- The national and state education councils and school boards work with school districts and schools to develop plans for implementing these technologies in the classroom.

In general, the panel said: Top educational priority should go to training teachers in math, science and technology and ensuring a steady stream of such qualified teachers; earlier and more effective instruction in these subjects must be made mandatory for all students; and the school day, week and/or year

must be expanded to accommodate these curriculum changes.

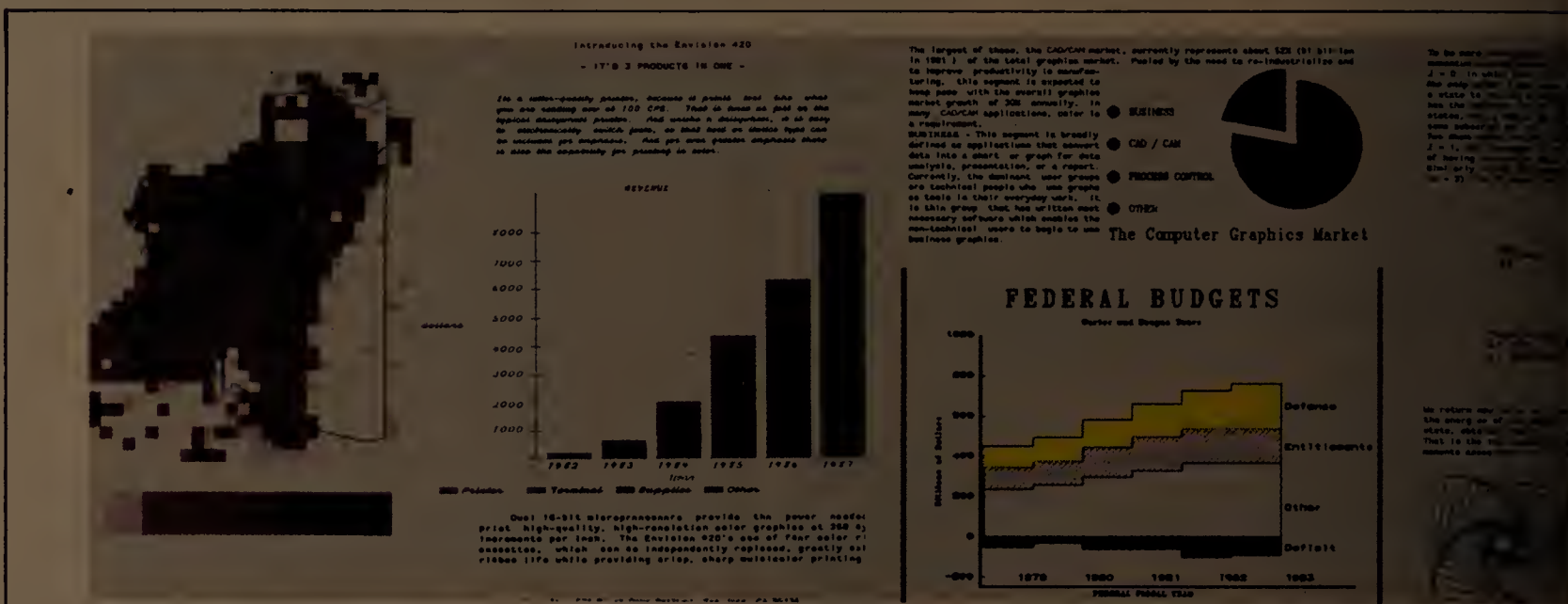
The report said local school districts should revise their elementary school schedules "to provide consistent and sustained attention to mathematics, science and technology" — a minimum of 60 minutes per day of math and 30 minutes per day of science in grades kindergarten to six and a full year of math and science in grades seven and eight.

Colleges and universities, the report added, should phase in higher math and science entrance requirements: four years of high school math, including a second year of algebra; course work covering probability and statistics; four years of high school science, including phys-

ics and chemistry; and one semester of computer science.

The panel also recommended the federal government encourage and partly finance establishment of "exemplary programs" in math, science and technology in every community. The panel recommended initially 1,000 such secondary schools and 1,000 such elementary schools throughout the country. The cost to the federal government, the report estimated, would be \$829 million, disbursed annually at the rate of \$276 million over a three-year period.

The cost to the federal government of all the programs recommended would decline from \$1.5 billion the first year to \$331 million in the sixth year, the report said.



RED HOT DEMO. SEE THE NEW ENVISION 430. IF ITS NOT MORE THAN A COLOR PRINTER, IT'S FREE.

You really can't lose. Because if we can't prove our new Envision 430 Color VectorPrinter™ is more than a color printer, we'll give it to you on the spot. Free.

WHAT YOU DON'T KNOW

What you might not know is that our new 430 has the uncanny ability to print high resolution pen plotter graphics. It can do that because we designed vector-to-raster conversion right into the printer.

And to make our 430 that much better than any other color printer you can buy, we also gave it the ability to print 100 characters per second in letter quality mode or 300 characters per second for drafts. This means our 430 gets your work done a lot faster. It also means you can print high speed drafts, letter quality text, high resolution raster graphics and plot vector graphics—on the same page! So when you buy our new 430, you're really getting four very usable talents in one very versatile printer.

A VERITABLE PARADISE OF COLOR

Even if you're not a Van Gogh, our new 430 gives you the ability to create inspired color graphics. It prints any four colors of red, green, blue, cyan, magenta, yellow or black in a single pass. You can also blend any of these colors to create an entire spectrum.

And because a one-eighth inch solid color band is printed on each pass of the 18-wire printing head, our 430 creates your masterpieces with incredible speed.

UNCOMMON VECTOR/RASTER GRAPHICS

We made our 430 compatible with the Hewlett Packard 7220 pen plotter. That means it's supported by a host of business, engineering, and scientific graphics software packages. And it gives you printed quality that's nothing short of superb. As well it should. Because we designed our 430 with exceptionally accurate horizontal and

vertical registration. It also prints raster graphics at 360x144 dots per inch for the highest resolution or 72x72 dots per inch for maximum speed. And to give you added flexibility, we gave our 430 the ability to print on plain paper and transparencies.

LETTER QUALITY MAGNA CUM LAUDE

When you begin using our 430 you'll quickly discover you don't have to be a wordsmith to create letter quality documents with punch. Any of the character fonts can be mixed or colored using host computer control.

WORDS 1444 (characters), lines or pages CAN BE PRINTED in any of EIGHT COLORS. One letter quality font in 10, 12, and 18 PITCH and one high speed font in 10 and 12 PITCH ARE STANDARD. This means you can make MESSAGES STAND OUT. You can COLOR specific words or PHRASES.

And our 430 comes with optional letter-quality character fonts like BOLD, italic, SCRIPT and ORATOR. Plus you

ACM Course Preps for CCP

WASHINGTON, D.C. — The Association for Computing Machinery's (ACM) chapter here will present a course to help applicants for the Certificate in Computer Programming (CCP) review for the examinations.

Slated to be held at the Department of Defense Computer Institute here, the course will meet from 9 a.m. to 5 p.m. for seven Saturdays beginning Oct. 8 and concluding Dec. 3, a week before the CCP exams.

Registration is \$195 before Oct. 1 and \$225 after that. Information can be obtained from ACM's Washington chapter at P.O. Box 39110, Washington, D.C. 20016.

By Offering Instruction via Electronics

'University' Enrolls Micros to Do the Teaching

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — An "electronic university," bringing together as many as 5,000 teachers and 500,000 students via personal computers by the end of 1984, was announced here recently.

The product of Telelearning Systems, Inc., San Francisco, the new educational undertaking will offer an initial 170 courses, ranging from accounting and assertiveness training to marine biology and crop shooting, available through various consumer outlets in about one month, according to the company's chairman, Ron Gordon.

The courses will be priced from \$35 to \$100. The system's communications package, priced from \$129 to \$229, depending on the personal computer used, will execute all communications protocols and logon procedures so that students can communicate with instructors with the push of one button, according to Telelearning.

The company said the package will be available for all major brands of personal computers.

Communications will be by one of three networks offered by GTE Telenet Communications Corp., Tymnet, Inc. or Uninet, Inc., respectively, and the costs will be included in the

course price.

According to Gordon, students will have the choice of working interactively with their instructors or working at their own pace via electronic mail procedures. All communications will be routed through the firm's San Francisco offices, and besides the special modem, the company will provide communications diagnostics and error detection and correction software, he said.

Students and teachers will have to provide their own computers and use their own modems, Gordon said. Courses will vary in the number of lessons offered, with from five to 10 standard for the initial offerings.

Like traditional school courses, the electronic courses can include reading assignments, homework and tests, he said.

Gordon, former chief executive officer of Atari, Inc., exclaiming "I am totally in love with this project," said that by "breaking down the barriers of time and distance," the electronic university will "bring education to millions and millions of people who are unable to have education."

Much Enthusiasm

The venture was announced at a Monday press conference, which featured remarks from U.S. Secretary of Education T.H. Bell and a White House official, both of whom were as enthusiastic about the project as Gordon.

"We're excited about the concept of the electronic university. I think that it couldn't have come at a more propitious time . . .

"The thrilling thing about the concept of the electronic university," Bell said, "is its flexibility and adaptability and its potential to reach all learners at all levels and to teach them where they are and individualize instruction for every student."

While Bell was careful to restrict his remarks to the use of new technology for education, a concept he has supported for a long time, James K. Coyne, head of the White House Office of Private Sector Initiatives, voiced considerable support for the Telelearning system.

Saying that the White House is interested in supporting joint ventures involving private firms and public institutions, Coyne, a former congressman, said, "This is like the first day of school for a whole generation of Americans. It's a wonderful new beginning, and we at the White House wish it well and look forward to providing it with assistance."

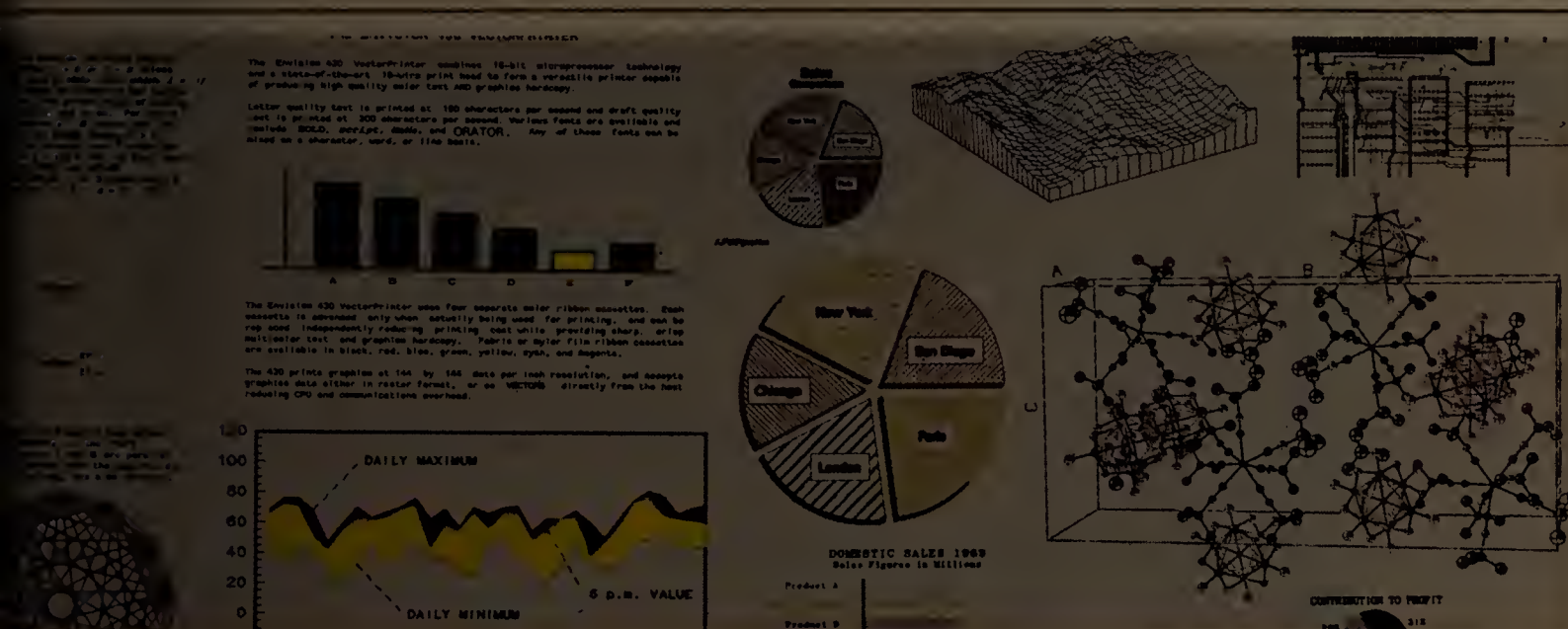
Providing further details about Telelearning's plans, company President Tom White said that besides the consumer market, the firm will be licensing its software and technology to schools, corporations and government agencies for a variety of educational programs.

By the end of 1984, he predicted, at least one million people will be taking instruction using the firm's technology.

According to the firm, a number of universities are experimenting with the firm's products to see how they can be worked into current modes of instruction. Company Chairman Gordon said he could not release the names of those schools until their negotiations with Telelearning are complete.

The firm also said the company is working with schools to gain high school and college credits for the courses.

Some of the professors who teach the electronic university courses will be working part time with Telelearning to supplement their usual income, and some will be full time, according to Gordon, who said the prices of the courses will be based on the credentials of the instructors and the number of lessons.



can define up to 196 characters to print both text and graphics. And to add versatility to your text creations we made our 430 compatible with the Diablo 630 ECS. Which means it supports the most popular text and word processing packages.

NO MORE RIBBON WASTE

Another nice little benefit of our 430 you won't find in other color printers is a four-cartridge ribbon system. Our separate color cartridges advance independently as each color is used. By doing things this way you don't end up wasting ribbon or running out of the color you want just when you want it. It also means lower cost per copy for you. Plus you also have a choice of high quality mylar ribbon cartridges and longer life nylon ribbon.

YOU DON'T HAVE TO PASS UP SPEED FOR QUALITY

Our 430 has been designed with an 18-wire printing head. This means that instead of having to pass over a line more than once to achieve high quality, our 430 prints letter quality characters in a single pass. It also does this with a great deal more speed because it never has to retrace the same line.

And while we're talking about speed, you should know we built our 430 with

a print control microprocessor which tracks the carriage through a unique closed-loop servo system and adjusts for carriage speed and direction during dot placement. That permits it to print while the carriage accelerates. Which is another reason it gets your job done a lot faster.



THE 430's UNFORGETTABLEY EFFICIENT

If you tear down our 430 you'll find two 16-bit microprocessors. One of them controls the printing mechanism; the other takes care of the host interface and command interpretation.

They both share a 128K-byte bit-map memory. So while you're busily telling the 430 what to print next—it's busily printing what you told it to print last.

A RED HOT DEMO

We think you'll be impressed when you see our 430. But that's not enough to get you to pick up your telephone and call. So if we can't prove it's more than a color printer, we'll give you a 430. Free.

Show a little sporting interest and take us up on our offer. You'll get a red hot demo and a chance to buy a printer and a plotter. Send us the coupon or call. Envision, 631 River Oaks Parkway, San Jose, CA 95134, (408) 946-9755 or Telex: 176437.

Text and graphics samples courtesy of: ISSCO, Megatek, Molecular Structure Corporation, and Precision Visuals, Inc.

**OK, ENVISION...
PROVE IT TO ME.
PLEASE CONTACT ME
REGARDING A DEMO.**

NAME

TITLE

COMPANY

ADDRESS

CITY

STATE, ZIP

PHONE

CW 10/83

Envision

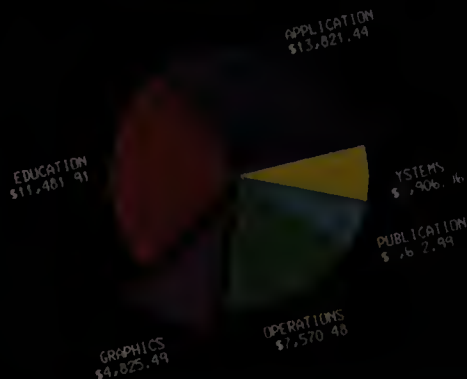
SAS...

Performance Tools for Every IBM 370 Operating Environment

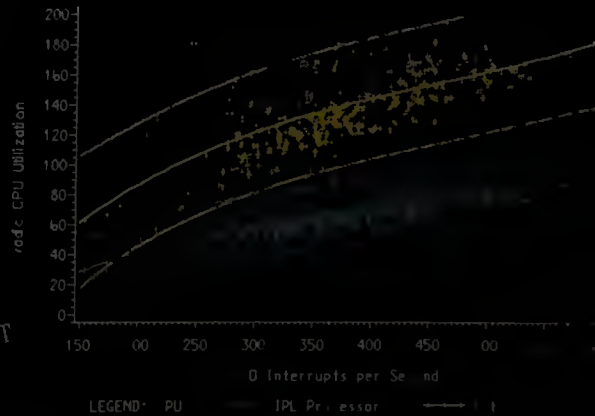
RESOURCE USAGE BY PROGRAM AND JOB
ANALYSIS OF VSE/POWER ACCOUNT DATA

PROGRAM	JOB NAME	CPU TIME IN SECONDS			I/O COUNT	
		NUMBER OF EXECUTIONS	SUM	MEAN	SUM	MEAN
DSERV	DSERV	1	2.88	2.88	311	311
	RESTORY3	1	0.72	0.72	1499	1499
DTSANALS	ICCFICS	9	110.44	12.27	34596	3844
DTSINIT	ICCFICS	4	364.80	91.20	52773	13193
DTSUTIL	ZAPOMVS	9	4.49	0.50	3227	359
LNKEDT	LETSFBTR	3	4.15	1.38	1479	493
	LINKDSM	2	0.88	0.44	708	354
	LINKFBRA	1	2.30	2.30	650	650
	LINKMATR	6	10.76	1.79	7072	1179
OBJMAINT	ORRZAPS	1	0.36	0.36	403	403
POZAP	ORRZAP	1	0.60	0.60	674	674
PLIOPT	BRANKS	1	5.16	5.16	4157	4157
	MATRLX10	5	52.92	10.58	4061	812
POWERJA	POWER/V5	4	226.12	56.53		
RESTORE	RESTORY3	1	2.38	2.38		
	SASLOAD	1	0.28	0.28		
RSERV	LETSFBTR	4	6.23	1.56		
	LINKFBRA	1	4.53	4.53		
SABVSE	ACCTEST1	3	20.35	6.78		
	ACCTEST2	8	81.44	10.18		
	ACCTEST3	1	13.81	13.81		
	ACCTEST4	4	73.36	18.34		

DECEMBER CPU USAGE STATISTICS BY DEPARTMENT
SUM OF CPU COST GROUPED BY DEPT



VM/SP Dyadic CPU Utilization



SAS®—always a leading performance measurement tool for IBM OS users—now offers VM/CMS, DOS/VSE, and SSX users the power and flexibility of the SAS System.

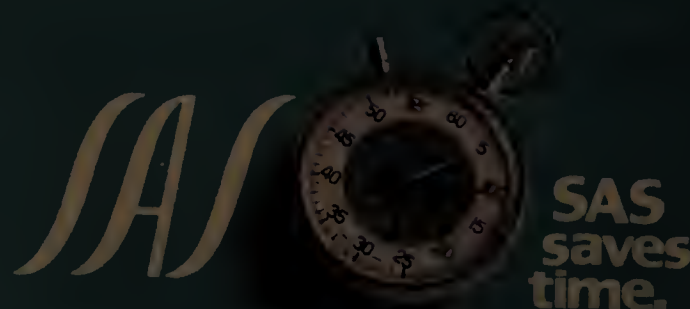
You get a twofold advantage with the SAS System. A library of ready-to-use procedures gives you the power to analyze performance statistics without formal training. SAS programs for reducing VM Monitor data and VSE Power accounting data are included with each installation tape. You can use these SAS programs to produce summary reports of key performance variables: user resources and system work loads. To print the reports, you can take advantage of the color charting, plotting and mapping capabilities in SAS GRAPH™ or use the line printer reporting facilities in SAS.

In addition to routine performance and accounting reports, the SAS System provides extensive data management and retrieval tools, combined with a sophisticated macro facility to handle all your capacity planning needs. You can use SAS to analyze performance data from several operating environments—creating an integrated system.

Now you can enjoy the power and flexibility of the SAS System—under OS, VM/CMS, DOS/VSE and SSX.

Call or write today. SAS Institute Inc., SAS Circle, Box 8000 Cary, NC 27511 USA. Telephone (919) 467-8000 Telex 802505.

The SAS System is available outside the USA from the institute's subsidiaries in Heidelberg, West Germany; Weybridge, Surrey, UK; Wellington, New Zealand; and Sydney, Australia; and from licensed distributors in Tokyo, Japan; Milano, Italy; Herzliya, Israel; and Singapore.



College Trustees Almost Cancel Robot Course

By Peter Bartolik
CW Staff

HAVERHILL, Mass. — The fear that robotics threatens American workers' jobs almost caused the governing board of a state junior college here to reject funding for training students in the emerging technology.

Northern Essex Community College was awarded a \$54,000 vocational education grant to establish a certificate course in robotics technology, but a motion to accept the funds was initially defeated by a five-to-five vote of the college trustees meeting on Sept. 7.

Trustee James Kelly reportedly argued against the program, charging that robotics is putting people out of work in several industries, such as the automobile industry.

College President John Dimitry asked the board to reconsider the motion, pointing out that 17 students had attended their first class in the

program that very morning.

On the second vote the board voted seven to three to accept the grant. One trustee who changed her vote in favor, Carolyn Whittaker, reportedly stressed that she "philosophically" opposes robotics and will not vote to continue the course next year.

The program is funded by \$54,000 in U.S. Department of Education funds that are awarded through the state education department. It provides for a 12-month certificate curriculum comprised of several courses focusing on hydraulics, mathematics, programmed devices and the maintenance of robotics equipment.

President Dimitry, in an interview with *Computerworld*, said the fears of trustees are justified to a degree, cit-

ing estimates that many currently furloughed auto industry workers may never be rehired. A native of Detroit himself, Dimitry said he deplores such a situation but realizes that American industry has been built on the continued development of "labor-saving devices."

The college, with a total enrollment of 8,800 students in day and evening divisions, is seeking to promote "computer literacy for everyone, whether they are robotics students or English students," Dimitry said. Some trustees believe the college has placed "too much emphasis" on high technology, he added.

That emphasis may reflect trends in local industry. The college is located in the Merrimack River valley

area, which for years has suffered from dependence on the declining textile industry.

In the adjoining town of North Andover is a Western Electric plant employing more than 6,000 people; the Lowell headquarters of Wang Laboratories, Inc. is within easy commuting distance; and Haverhill itself is currently seeking federal funds that would enable Wang to build a plant there.

Despite the cool reception from some trustees, Dimitry said he hopes the course is successful and that the grant will be extended for a second and a third year. "Three years ago, some [trustees] used to tell me computers are just a passing fad — they don't tell me that anymore," he said.

Course to Cover Use of Micros In Corporations

WHEATON, Ill. — A seminar on the use of personal computers in the corporate environment is being offered to individual data centers by Personal Computer Management, Inc. (PCM) here.

A two-part seminar, the "Management Seminar on Personal Computers" begins with a two-hour overview of the reasons for the popularity of the personal computer, the applications that are being seen in the corporate community and the most frequently used software packages. The second half of the seminar is a case study that demonstrates the use and power of the personal computer and its software.

PCM founder Anthony J. Paoni conducts the seminar at client sites. It ranges in cost from \$2,000 to \$5,000, depending on the size and duration of the seminar. Further information is available from PCM, 1626 Orth Drive, Wheaton, Ill. 60187.

Publishing Arm Of IBM Offers Videotape Series

CHICAGO — SRA, Inc., the educational publishing arm of IBM, has issued a series of 16 videotapes on new IBM products, newly released software, installation and performance.

The Technical Update Series, to be sold by subscription, was developed from an in-house educational effort at IBM, according to a spokesman for SRA. The tapes cover such topics as MVS/SP, IMS/VS and 3380 installation and performance. Ten more videotapes will be added to the series this year, the spokesman added.

Subscriptions cost \$1,600 for 20 tapes in two years. Single tapes are listed at \$100 from SRA, 155 N. Wacker Drive, Chicago, Ill. 60606.

PROTOCOL CONVERTER MADE SO SIMPLE, AZTEK CAN MAIL YOU ONE.



If you're in the market for a full-screen capability for your terminal then look no further than the software protocol converter from Aztek Computing. Our low cost SIM3278 transforms an ASCII terminal running under VM/370 into a simulated 3270 terminal without operating system or hardware modifications of any kind.

Avoid the cost of conventional hardware or the hassles of black box modifications. Transform those under-utilized and non-conventional terminals, be they micros, dumb terminals, personal computers or executive workstations with our powerful software package.

AZTEK
Computing Inc

SIM3278 from Aztek takes about 15 minutes to install, works with most ASCII terminals, and supports up to 255 CRT's per application. Proven and tested for over a year, SIM3278 is now providing full-screen capabilities at 100 user sites. Comes complete with installation and operating documentation.

Let us mail you an Aztek SIM3278 tape today on a 30-day trial. Give us a call for complete technical details and prices. And by the way, we'll send yours in a box.

Aztek Computing Inc
Colonel By Towers
969 Bronson Avenue
Ottawa Ontario Canada K1S 4G8
Telephone (613) 235-6736
Telex 053-4130

Calendar

Week of Oct. 16

Oct. 20-21, Hilton Head Island, S.C. — **Microprocessors: Management Tool.** Contact: Southern Training Corp., Suite 1030, SCN Center, Columbia, S.C. 29201.

Oct. 20-21, Minneapolis — **IMS/VS Data Communications Programming.** Contact: Kaaren Perez, Comped, 10 E. 21st St., New York, N.Y. 10010.

Oct. 20-21, Washington, D.C. — **IMS/VS Dump Reading.** Contact: Data Base Management, Inc., 1075 Tol-

land Tnpk., Manchester, Conn. 06040.

Oct. 20-21, Chicago — **How to Use Dbase II on Your Personal Computer.** Contact: American Management Associations, 135 W. 50th St., New York, N.Y. 10020.

Oct. 20-21, Washington, D.C. — **Advanced Office Automation for the 1980s.** Contact: Software Institute of America, 339 Salem St., Wakefield, Mass. 01880.

Oct. 20-21, Worcester, Mass. — **CAD/CAM: Con-**

cepts, Systems and Applications. Contact: Kathy Shaw, Office of Continuing Education/Higgins House, Worcester Polytechnic Institute, Worcester, Mass. 01609.

Oct. 20-21, Newport Beach, Calif. — **Computer Protection Seminar and Exhibits for Security and Data Processing Professionals.** Contact: Edward J. Anderson, Corporate Security Director, Vidal Sassoon, Inc., 2049 Century Park E., Los Angeles, Calif. 90067.

Oct. 22, Pittsburgh, Pa. — **Developing Effective User Manuals.** Contact: Carol Janik, Carnegie-Mellon University, Pittsburgh, Pa. 15213.

Week of Oct. 23

Oct. 23-25, Airlie, Va. — **Document-Based Optical Mass Memory Systems.** Contact: Richard D. Murray, Director of Conferences, Institute for Graphic Communication, 375 Commonwealth Ave., Boston, Mass. 02115.

Oct. 23-26, Hilton Head Island, S.C. — **Facts 83: A New Look at Financial Technology.** Contact: Association of Information Managers, Facts 83, Suite 2221, 111 E. Wacker Drive, Chicago, Ill. 60601.

Oct. 23-27, Scottsdale, Ariz. — **The 1983 Infodata National Users Meeting.** Contact: The 1983 Infodata National Users Meeting, Infodata Systems, Inc., 5205

Leesburg Pike, Falls Church, Va. 22041.

Oct. 24, New York — **MIS: The Micro Link.** The Center for Management, Baruch College, 17 Lexington Ave., Box 520, New York, N.Y. 10010.

Oct. 24, San Francisco — **Structured Systems Development.** Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

Oct. 24, Chicago — **Computer Planning and Acquisition Strategy.** Contact: Annex Computer Report, Suite 530, 120 E. 56th St., New York, N.Y. 10022. Also being held Oct. 26 in Atlanta and Oct. 27 in New York.

Oct. 24, New York — **IBM CICS/VS Concepts, Products and Service.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Oct. 24-25, Washington, D.C. — **IMS/VS Application Development Facility II.** Contact: Data Base Management, Inc., 1075 Tolland Tnpk., Manchester, Conn. 06040.

Oct. 24-25, Philadelphia — **Data Communications: Advanced Concepts, Products and Service.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Oct. 24-25, Hartford, Conn. — **Focus Query Language for End-User Personnel.** Contact: Data Base Management, Inc., 1075 Tolland

Tnpk., Manchester, Conn. 06040.

Oct. 24-25, Washington, D.C. — **DBase II.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held Oct. 26-27 in Baltimore.

Oct. 24-25, Los Angeles — **Vsam Performance and Tuning.** Contact: Ken Carozza, Regional Marketing Coordinator, Goal Systems International, Inc., 5455 N. High St., Columbus, Ohio 43214.

Oct. 24-25, New York — **Managing Projects in the Structured Environment.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

Oct. 24-25, Washington, D.C. — **How to Manage Data and Information as a Resource.** Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

Oct. 24-25, New York — **Team Management Workshop.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

Oct. 24-25, Williamsburg, Va. — **Software Verification and Validation: Realistic Project Approaches.** Contact: Data Processing Management Association Education Foundation Seminars, Department SVV, Suite 2000, 3420 Kashiwa St., P.O. Box 3608, Torrance, Calif. 90510.

Oct. 24-25, New York — **IBM's Systems Network Architecture: A Master Plan for Teleprocessing.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Oct. 24-25, Chicago — **Guidelines for Successful Selection, Acquisition and Operation of Microcomputer and Minicomputer Systems.** Contact: Structured Methods, Inc., 7 W. 18th St., New York, N.Y. 10011.

Oct. 24-25, Eugene, Ore. — **The Second Annual Pacific Northwest Computer Graphics Conference.** Contact: The Second Annual Pacific Northwest Computer Graphics Conference, 111 Susan Campbell Hall, University of Oregon, Eugene, Ore. 97403.

Oct. 24-26, Chicago — **Personal Computers: Strategies for Managing.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

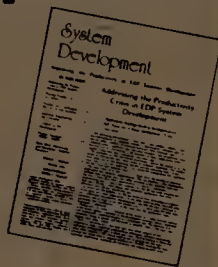
Oct. 24-26, Boston — **DOS/VSE Job Control Language.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

Oct. 24-26, New York — **The 1983 Annual Association for Computing Machinery Conference: Extending the Human Resource.** Contact: The Con-

Improve Systems Productivity With System Development

A monthly newsletter on improving the productivity of EDP Systems Development

User Experiences
Case Studies
Conference Reports
Literature Reviews
Products & Services



\$75.00/Yr.

- Keep up-to-date on the latest developments in productivity improvement
- Save time each month in reading and research—we bring it all together
- Just one important idea could save you thousands in development costs

Return this coupon for a sample issue.

Applied Computer Research, PO Box 9280, Phoenix, AZ 85068

Yes, please send me a free sample copy of System Development, with no obligation.

Name _____

Title _____

Company _____

Address _____

City/State/Zip _____

Phone
(602)995-5929

Introducing the Most POWERFUL General Ledger Software Solution for the VAX



What is MAPS/GL?

MAPS/GL is a comprehensive general ledger/financial management system for VAX minicomputers, incorporating general ledger accounting, financial control, budgeting and advanced reporting functions.

Designed for today's powerful, interactive minicomputers and to be linked with MAPS/MODEL and MAPS/GRAPH, Ross' financial modeling and business graphics packages, MAPS/GL brings you a truly interactive and integrated financial management software system.

All MAPS products are available for license or via ROSS/NET remote computing and are backed

with 11 years experience in customer and product support.

All the Flexibility You'll Ever Need

You can tailor MAPS/GL to your individual needs, controlling accounting structures, organizational roll-ups and reporting specifications. As your company grows and your needs change, you can change your system to adapt.

Its powerful but easy to use report writer brings flexibility to your daily needs as well. Ad hoc reporting from MAPS/GL's financial database can solve your special information needs.

MAPS from Ross Systems.

The single source for integrated, interactive financial management software.

DEC and VAX are trademarks of Digital Equipment Corporation. MAPS and ROSS/NET are trademarks of Ross Systems, Inc.

MAPS/GL was developed by Price Waterhouse under the name "FM80" and adapted for the VAX by Ross Systems, Inc., with the support to keep MAPS/GL current with new FM80 releases. Price Waterhouse markets FM80 on other computers.

MAPSGLTM

from Ross Systems

Financial Software Solutions

DISTRICT OFFICES:
Palo Alto, CA
San Francisco, CA
Los Angeles, CA
Dallas, TX
New York, NY

CORPORATE HEADQUARTERS
1860 Embarcadero Road
Palo Alto, CA 94303
(415) 856-1100

Calendar

ference Coordinator, Association for Computing Machinery Headquarters, 11 W. 42nd St., New York, N.Y. 10036.

Oct. 24-26, Dallas — **IMS/VS Message Format Services**. Contact: Data Base Management, Inc., 1075 Tolland Tnpk., Manchester, Conn. 06040.

Oct. 24-26, New York — **Information Center Concepts: Organization and Implementations**. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Oct. 24-26, Atlanta — **Basic Systems Analysis**. Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

Oct. 24-26, Pittsburgh, Pa. — **Project Leadership Workshop**. Contact: Brandon Systems Institute, 4720 Montgomery Lane, Bethesda, Md. 20814.

Oct. 24-26, New York — **Computer Generated Business Graphics for Today's Manager**. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Oct. 24-26, Anaheim, Calif. — **Advanced Communications and Network Engineering**. Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

Oct. 24-26, Washington, D.C. — **Minicomputers, Microcomputers/Processors for Non-Electrical Engineers**. Contact: The George Washington University, Continuing Engineering Education, Washington, D.C. 20052.

Oct. 24-26, San Francisco — **EDP Project Management: A Practical Approach**. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Oct. 24-26, Washington, D.C. — **Project Leadership Laboratory**. Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

Oct. 24-26, San Francisco — **Office Automation: Strategic Planning, Design and Implementation**. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Oct. 24-27, Washington, D.C. — **Computer Graphics Systems: Hardware, Software and Application**. Contact: The George Washington University, Continuing Engineering Education, Washington, D.C. 20052.

Oct. 24-27, Salt Lake City, Utah — **CICS On-Line Application**. Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

Oct. 24-27, Washington, D.C. — **Local Area Computer Networks**. Contact: The George Washington University, Continuing Engineering Education, Washington, D.C. 20052.

Oct. 24-28, Houston — **Advanced Structured Analysis**. Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

Oct. 24-28, Boston — **Systems Analysis Workshop**. Contact: Brandon Systems Institute, 4720 Montgomery Lane, Bethesda, Md. 20814.

Oct. 24-28, Boston — **Structured Analysis and Design Workshop**. Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

Oct. 24-28, Oakbrook, Ill. — **Network Performance Management**. Contact: The Institute for Software

Engineering, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

Oct. 24-28, Chicago — **DP Project Management**. Contact: Structured Methods, Inc., 7 W. 18th St., New York, N.Y. 10011.

Oct. 24-28, Dallas — **Structured Design Workshop**. Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held Oct. 24-28 in Portland, Ore.

Oct. 24-28, Englewood Cliffs, N.J. — **MVS Systems Management**. Contact: The Institute for Software Engineering, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

Oct. 24-28, New York — **Structured Design for Real-Time Systems**. Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York,

N.Y. 10036. Also being held Oct. 24-28, Long Beach, Calif., and Oct. 24-28 in Atlanta.

Oct. 24-28, Los Angeles — **Structured Design Workshop**. Contact: Structured Methods, Inc., 7 W. 18th St., New York, N.Y. 10011.

Oct. 24-28, Indianapolis — **Project Planning and Control Workshop**. Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held Oct. 24-28 in New York.

Oct. 24-28, Lombard, Ill. — **A Program for Professional System Analyst Development**. Contact: Shirley Cerone, Cara Corp., 611 E. Butterfield Road, Lombard, Ill. 60148.

Oct. 24-28, Long Beach, Calif. — **Ada Software Engineering**. Contact:

Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

Oct. 24-28, New York — **Contemporary Computer Auditing: Integrity Controls**. Contact: Marge Umlor, EDP Auditors Foundation, 373 S. Schmale Road, Carol Stream, Ill. 60187.

Oct. 24-28, Dallas — **CICS/VS Macro-Level Coding**. Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

Oct. 24-28, Orlando, Fla. — **IDMS-DB Programming**. Contact: Harris Education Center, 1025 W. Nasa Blvd., Melbourne, Fla. 32919.

Oct. 24-28, San Francisco — **IMS Application Programming**. Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

HAMILTON CADD System Computer Aided Design and Drafting



For as little as \$25,000, HAMILTON provides a complete hardware-software CADD System.

At the heart of this package is Design Graphix™, a full-function 3D CADD System, which includes TEACH, an on-line programmed course providing a thorough understanding and mastery of the system in just a few days.

This dynamic system is layered on DEC PRO 350, PDP-11 or VAX hardware, and supports a full range of Hewlett Packard and Tektronix graphics peripherals. The complete CADD System is available for Purchase, Rental or Time Sharing.

Design Graphix is a trademark of Engineering Systems Corporation / DEC, PRO 350, PDP-11, VAX are trademarks of the Digital Equipment Corporation.

For further information, demonstration or individual quotation, call or write NOW!

HAMILTON

HGL Software

Hamilton Rentals

THE HOUSE OF VAX

See us at
DEXPO West 83,
Booth 601

6 Pearl Court, Allendale, NJ 07401
TOLL FREE 800-631-0298
In New Jersey 201-327-1444

415 Horner Ave., Toronto M8W4W3
TOLL FREE Ont. & Que. 800-268-2106
All other prov. 800-268-0317
In Canada 416-251-1166

NEW YORK • DALLAS • MONTREAL • CALGARY • LONDON • PARIS • DUSSELDORF

City, Waste Systems Vendor File Suits

Court Asked to Settle Performance Dispute

By Peter Bartolik
CW Staff

BIRMINGHAM, Ala. — The federal district court here has been asked to settle a performance dispute between the city government and a Missouri-based vendor of waste management systems.

Cardinal Scale Manufacturing Co. of Webb City, Mo., filed suit here late in August with a claim for \$18,658 against the city of Birmingham for the unpaid balance of a contract for the Waste Information Loggings Systems (Wilogs) that Cardinal Scale installed at two city landfills. Earlier this month, the city responded with a counterclaim seeking the return of

\$93,291 already paid to Cardinal Scale for the systems, along with damages that could exceed \$1 million.

Cardinal Scale's suit was characterized as a "defensive action" by attorney Frank McPhillips, a member of Cabanis and Johnston, the law firm representing the city.

A spokesman for Cardinal Scale said he could not comment on pending legal action and declined to describe the system installed by the company.

According to a report in *The Birmingham Post-Herald*, lawyers for Cardinal Scale said that last January the company had been promised pay-

ment if the equipment worked without incident for 30 days beyond that point, which the lawyers claimed it did. But McPhillips told *Computerworld* that "the equipment has not worked since the city purchased it back in 1981." The city, he said, is seeking to recover damages for an estimated \$1 million loss of revenues during a 16-month period when landfill officials were forced to estimate waste materials being trucked in by contractors.

Additionally, the city is asking for payment of costs it will incur to remove and store the equipment.

According to McPhillips, Wilogs consists of scales hooked to computer

systems that determine the amount of garbage being trucked into the landfills and print out weights and applicable fee charges. "It just never did produce accurate results," he said. "Some days [Wilogs] was just putting out nothing."

The city, McPhillips said, has also filed suit to recover a \$111,949 performance surety bond from the American Casualty Co. and for damages against the installing company, Arrow Equipment Co. of Pelham, Ala.

Phoenix Users To Meet Dec. 12 In San Francisco

CLEVELAND — The first national Phoenix Users Group meeting will be held Dec. 12 during the Data Training '83 Conference (Dec. 12-15) at the San Francisco Hilton.

Nancy Weingarten, publisher of *Data Training*, will give the welcome address. Included in the agenda are a discussion on goals, a progress report on the product and user report presentations.

Seven regional Phoenix users groups have formed in anticipation of the national meeting. Membership in the regional users groups, recently formed in Cleveland; Columbus, Ohio; Dallas; Philadelphia; Richmond, Va.; San Francisco; and North Carolina, is open to all Phoenix users, as well as those undergoing active trials of the system, a users group spokesman said.

According to Gary Livingston, training coordinator for Blue Cross of Northeast Ohio here, the regional and national groups will operate apart from Goal Systems International, Inc., the creator and marketer of the Phoenix computer-based training system.

But, he added, the organization has been set up so that once users groups are formed, they may call upon Goal Systems for any support they need in the form of publicity, speakers, seminars and the like.

The meeting is free to current Phoenix users. Further information is available from Gary Livingston, 15903 Clifton Blvd., Lakewood, Ohio 44107.

The 1983 JAMES MARTIN SEMINAR

A new seminar which no analyst or programmer can afford to miss

So what if James Martin can predict your future?

Since 1960, James Martin's prognostications about technology, and the computer industry in particular, have proven uncannily accurate. James Martin has consistently identified precedent-setting capabilities before they were discussed by experts within the DP and telecommunications communities.

The James Martin Seminar: designed to dramatically increase your organization's productivity.

James Martin will not only predict your future, but he will guide you through the emerging technologies which require an understanding of the newest

methods, design techniques, systems organization and patterns of management. 16,000 attendees worldwide have discovered their future... have you? Attend a James Martin Seminar this Fall and discover why James Martin is recognized as the leading expert in the computer industry.

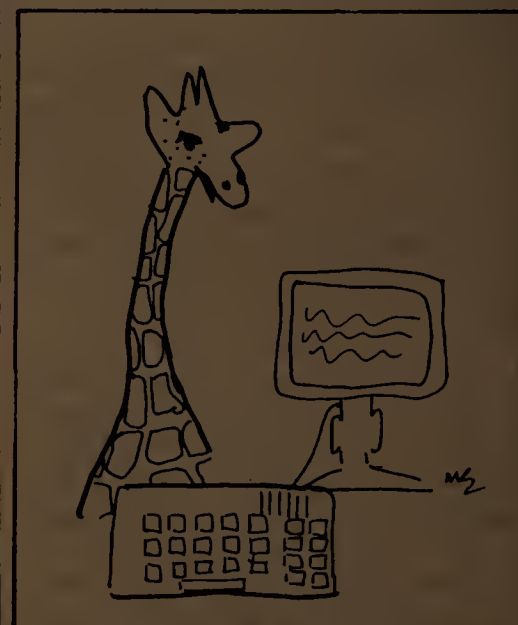
Call (213) 394-8305 or mail the coupon today for a detailed brochure

New York	October 10-14, 1983
Toronto	October 24-28, 1983
Los Angeles	October 31-November 4, 1983
Atlanta	November 14-18, 1983

NAME _____
COMPANY NAME _____
ADDRESS _____
CITY/STATE/ZIP _____
TELEPHONE _____

**TECHNOLOGY
TRANSFER
INSTITUTE**

741 10th ST., SANTA MONICA, CA 90402
CW 9/26/83



'I Thought They Said This Terminal Was Ergonomically Designed.'



No more waiting.

IBM System/38 now provides direct access for up to 128 work stations, plus greatly enhanced communications.

It works like a much larger computer, yet it's a compact, easy-to-use system.

And now, we've upgraded System/38 in almost every way.

We've doubled maximum main storage, to 8 megabytes. Increased maximum disk storage 85%, to 4,957 megabytes. Increased work stations 60%, to 128. Added BASIC to the currently supported RPG and COBOL.

System/38 can now communi-

cate with virtually all IBM computers, office systems and terminals, and with the IBM Personal Computer.

Converting IBM System/34 software is easier than ever. And an array of industry application packages is available, covering manufacturing, distribution, hospitals, hotels, apparel and transportation.

IBM System/38: thanks to its advanced data-base architecture...

It increases programmer productivity...

It lets users share programs, data files and system resources online, on a real-time basis...

And now, it lets more people than ever share information at the same time.

To arrange for a free demonstration of System/38, call your local IBM representative or *IBM Direct's* toll-free number below.

Or send in the coupon.

For a brochure or free demonstration:

IBM System/38

Write today to: IBM, DRM, Dept. BK3
400 Parson's Pond Drive
Franklin Lakes, New Jersey 07417

☐ Please send me a free brochure about the IBM System/38.

☐ I'd like a free demonstration of the IBM System/38.

NAME _____ TITLE _____

COMPANY _____

STREET ADDRESS _____

CITY _____ STATE _____ ZIP _____

BUSINESS PHONE _____

IBM

90

Call *IBM Direct* 1 800 IBM-2468 Ext. 90.

EDITORIAL

Trouble in Paradise

Is a personal computer industry shakeout kicking into high gear, or is the recent bloodletting at many key personal computer vendors more a sign of management inability to cope with unbridled growth?

Whatever the case, it is clear there's trouble in paradise.

Price cutting is cannibalizing once lofty profit margins, sending them dangerously close to the break-even point for some vendors. The work force at companies that just a year ago couldn't hire people fast enough has been pared 30%, 40%, 50% and more in recent months. Worst of all, the bulls of Wall Street and the venture capital market are casting an increasingly bearish eye at the personal computer vendors.

How can all this exist in an industry segment doubling each year as personal computer sales hurtle toward the \$25 billion mark in 1986?

There are a number of factors, organic and self-induced, contributing to the present woes and, very likely, ultimate demise of some personal computer makers:

- **There are too many personal computer makers.** At Comdex in Las Vegas last year, over 150 manufacturers introduced microcomputer hardware. This is a markedly different situation from two years ago, when many now-troubled personal computer makers competed not against the IBMs and Digital Equipment Corp.s but largely with each other. Today, with typical retail stores stocking five or six brands of personal computer, it is simply harder getting your machine where it can be sold.

- **The mainframers have all finally jumped aboard the personal computer bandwagon.** The bad news here for the independent personal computer makers is that the mainframers are selling heavily into their installed base. Computer retailers will stock the IBM Personal Computer or DEC Professional ahead of machines from Victor Technologies, Inc. or Fortune Systems Corp. That's show biz.

- **It's very tough to compete toe to toe with IBM.** Even Apple Computer, Inc. and Hewlett-Packard Co. have recognized they're swimming in a Big Blue sea, providing Microsoft, Inc.'s MS-DOS for Apple's Lisa and HP's personal computer entree last week. Companies like Vector Graphic, Inc. have indicated they will steer clear of IBM's strengths, seeking comfort in specific market niches. The problem is, IBM is becoming ubiquitous, and niches may not allow much growth.

- **Standards for second-generation personal computer technology are expensive to develop, but no less vital to survival.** Sixteen-bit microprocessors are the rule, and internal random-access memory of 256K bytes and support of 5¼-in. Winchester disk drives don't hurt either. Try building that kind of machine (and then selling it at a profit) on a limited R&D budget.

- **It's too hard to manage 100% growth in a multi-million dollar, single-product company that began as a basement operation a few years ago.** Vendors have suffered greatly from mistakes. Computer Devices, Inc.'s IBM-compatible portable could not accommodate the 5¼-in. floppy disks on which are written over 1,000 programs for the IBM Personal Computer. And both Osborne Computer Corp. and Vector Graphic burned themselves by announcing products too far in advance of delivery dates, killing sales of their existing lines.

On the positive side, users may witness a hastening toward industry standards in the personal computer world, albeit standards dictated largely by IBM's moves.

But users will likely have less from which to choose. While this will be less confusing, there may be some very good machines and ideas that don't get to market. Given that the IBMs and DEC's and Apples do not have a monopoly on innovation, this is too bad.



'You Exist. Therefore, You Owe.'

LETTERS

Breaking and Entering

In the article "Hacking: Mark of Genius or Plain Theft?" [CW, Sept. 12], *Computerworld* seems to support the notion that youths that use their computers to break into computer systems and files are only playing games.

What they are really doing is called breaking and entering. The fact that they use the tools of modern technology makes no difference. They are breaking and entering just as surely as if they had picked the lock on a front door and wandered around in a building instead of wandering around electronically in computer files.

The contention of SRI International, Inc. researcher Geoffrey Goodfellow that these youths should be courted and encouraged is ridiculous. You don't leave the front door of your business or government agency open to let in anybody who is only curious.

While these hackers may be brilliant, their pranks should not be tolerated. It is only a matter of time before some data base somewhere is seriously damaged or destroyed. There have already been several cases of people using personal computers to steal money or data. Don't encourage these hackers by letting them assume their pranks are acceptable.

Bennet N. Babcock
Bethesda, Md.

Quit Coddling Hackers

I noted with interest Lynn E. Queen's letter to the editor [CW, Sept. 5].

For a data processing director to suggest that hackers be given an award for cracking a system is ridiculous.

If Queen thinks hackers should be

awarded, then why doesn't she award them jobs at her installation? Since she holds the title of DP director, she probably has the authority to do her own hiring, and surely she must have a need for one or more hackers on her staff.

Just think of all the flaws they could find with her systems — it's mind-boggling.

Hackers should be treated as criminals, because that is what they are. We treat juvenile vandals harshly for what they do, and as far as I'm concerned, hackers are vandals.

Perhaps we should confiscate their microcomputers, bar them from computer usage for a year or two and fine them a couple of thousand dollars for the overall aggravation they cause.

It is about time for a few laws to curtail this behavior — not state laws, but tough federal laws that make no distinctions based on age. If you break the law, then that's it, no second chances.

Let's quit coddling these fools, and don't award them or suggest that they be awarded.

Write or call your congressman, and demand laws to put an end to the hacker.

The data processing profession does not need or even have a place for these people.

J.B. Siegfried
DP Training Instructor
Harrisburg, Pa.

Computerworld welcomes comments from its readers. Preference will be given to typed, double-spaced letters of 150 words or less. Letters may be edited for purposes of brevity and clarity. Letters should be addressed to Editor, *Computerworld*, 375 Cochituate Road, P.O. Box 880, Framingham, Mass. 01701.

THE DATA CENTER/John P. Murray†

The State-of-the-Art Crisis: MIS Inertia

Most of us recognize the fact that our business lives are being rapidly changed by dramatic advances in information processing technology. These changes are so rapid in fact that the phrase "state of the art" tends to become almost meaningless. That which is at the leading edge today gives way very rapidly to something more sophisticated. Everyone is being impacted by these changes, yet we in management information systems (MIS) are more affected than others. Everything seems to change so quickly, there are so many options available, that all MIS managers suffer to at least some degree from the pace of change.

It is interesting, though, that in the face of these new challenges and opportunities there are some, perhaps a large number of, installations that steadfastly refuse to move to these new information processing approaches. It is not particularly unusual to hear MIS managers state, "Even though it costs us more and it takes more time, we develop all our systems in-house because our needs are unique; we could never adapt software packages to our needs."

There is great reluctance to move to the use of a data base management system (DBMS). Lengthy studies are initiated to consider the needs of the organization and to survey various DBMS available. Often, the result of all this is (because the technology is developing so rapidly) to delay the decision in order to wait a while longer to see if something better will become available. Each new development only serves to reinforce the belief that waiting a bit longer will produce something even better. As a result, nothing gets done.

'A real problem in many MIS installations is the absence of any long-range planning that seeks to take advantage of the developing technology to serve the organization better. What is required is a plan that is linked to the strategy of the organization in order that the real advantages of this evolving technology can be identified and used, not only for MIS, but for the benefit of the entire organization.'

A real problem in many MIS installations is the absence of any long-range planning that seeks to take advantage of the developing technology to serve the organization better. What is required is a plan that is linked to the strategy of the organization in order that the real advantages of this evolving technology can be identified and used, not only for MIS, but for the benefit of the entire organization.

A random sampling of a number of MIS installations would probably show that because of this reluctance to recognize the value of new approaches, a day of reckoning is about to dawn in many of the installations. There are a great many installations that are not only unwilling to use the developing technology, but that go about the process of doing things in the same old fashion. These installations continue to build on obsolete technology because that is something with which MIS management is comfortable. Of course this is shortsighted, not only for the MIS department, but for the entire organization.

The continued building of inadequate MIS processing solutions sim-

ply exacerbates an already difficult situation. The tangle of MIS systems that do not interact, the continual creation of redundant data, the required reliance upon several old timers to keep the old systems operating are surely invitations to eventual difficulty.

Committing Time, Money

What is certain to occur sooner or later is the ordeal of the organization's senior management being forced to face up to the fact that in order to clean up the current mess, never mind moving ahead to new technology, a great deal of time and money will have to be committed to the effort.

This is not a new phenomenon; certainly all of us are aware of at least several installations that have experienced more than one reorganization.

This process appears to be cyclical: The MIS function is allowed to deteriorate, a new MIS manager is brought in and given support, progress is made (up to a point), things begin to deteriorate and so on.

Appropriate Use

The management of an MIS instal-

lation has a duty to its management to raise the question of the appropriate use of state-of-the-art processes and to recommend a plan that will make appropriate use of those processes.

This is not easy; it can be fraught with risk, yet it must be done. The issue must be really to use the new technology, not simply an attempt to gloss over some of the current problems under the guise of "moving ahead."

As information processing technology continues to develop, as competition becomes increasingly fierce, some organizations may find they have waited too long to move to the new technology, and they will not be able to afford the cost of moving to a state-of-the-art position and will be forced out of business. Other organizations may be able to pay the price, but they will find the price high indeed.

The Solution

The solution is not to wait until an almost inevitable situation develops.

The reaction of a technical "gridlock," where the cost of rebuilding the organization's old systems or of an urgent and massive movement to the new technology are the only immediate information processing options, must be avoided.

An effective, reasonable (though perhaps expensive) phased plan that will place the organization in the proper technical position and keep it there is the answer.

Murray is director of MIS for Ray-O-Vac Corp., Madison, Wis. He is responsible for worldwide MIS activities. Murray has 21 years of DP experience, 10 of which have been devoted to the management of data centers.

HUMAN CONNECTION/Jack Stone†

Stand Aside, Bogey: Foreign Intrigue DP Style

It's been more than five years since I purchased my personal computer — we called them micros in those days — four or so since Processor Technology, the manufacturer of my Sol 20, went "belly up" and about three since my retailer, the Georgetown Computer Emporium, sold out and departed from its second-story digs atop M Street's El Caribe restaurant.

It was always fun to visit the emporium — not only to gaze longingly upon some new shiny machine, but also to inhale the gentle odors emanating from the paella preparation underfoot. Perhaps it was this experience that threw my fantasies about foreign travel into high gear: I saw myself in the role of a worldwide correspondent for *Computerworld*, outfitted in a '40s fedora and slightly worn trenchcoat ala Casablanca's Bogart, but terribly modern.

Indeed, I was carrying in a black leather camera case, a battery-driven, intelligent terminal that allowed me to prepare sensitive, stirring prose in an off-line manner and dump it into a modem for electronic delivery to

CW headquarters. I even dreamt up a name change for my column — Have Computer Will Travel.

Met Needs, Capabilities

Well, I never had the nerve to offer such an idea to the editor, expecting little more than a few guffaws in response to such novelty; besides, at the time, no such terminal existed. So I had to satisfy myself with the Sol which, other than packaging, really met my needs and capabilities: trivial word processor software; toy-like file manager; a very powerful somebody-or-other's Soft Basic that I couldn't understand or use but that impressed my friends; and Target, an antique videogame that kept the kids occupied. Also, I loved to show off the genuine walnut trim and the throbbing Mediterranean blue accent panels.

And the price wasn't all that bad, not in that era anyway. It set me back a little more than \$5,000, including a Diablo Systems, Inc. Diablo printer that never failed until I announced during a lecture that it had never failed and went home that evening

and it failed.

I've put about four more into it over the years for software, upgrades and disk replacements — my genius youngest kid blew out the drives when he plugged a shorted lamp into my power panel.

Traveling System

The system weighed in at about 100 lb, but was organized into components that were separately transportable and connectable through cables. I've hauled it just about everywhere, motoring with it resting comfortably in the trunk through much of the U.S. I have even run the machine on my boat using a diesel generator for power, but temporarily discontinued this configuration when my genius second son forgot to close the forward deck hatch and the system was caught in a summer squall. (The repairman couldn't understand how a cake of salt came to grow on my motherboard, and my nervous response was "Guess they don't make 'em like they use to.")

My first shot at foreign travel with my machine didn't take place until

this past fall after feeling the first shudder from a northeaster's chill. I rather enjoyed the concept of driving to Mexico and wallowing round in tropical sunshine on the white sands of a remote Pacific beach for an indefinite number of weeks while writing away during the evenings on my beloved machine and released from huddling around a radiator for the duration of yet another Washington, D.C., winter freeze-up. So I packed the Sol, along with the trench coat, and whisked off to the border with friend and offspring.

Everything went perfectly up until, but not including, the border crossing when the Mexican "federals" kicked us right out of the country, alleging that the computer would attract bandits or unscrupulous police. I was forced to store the machine in Laredo, Texas, before recrossing the border, thereafter reduced to using a latter-day writing technology, but one acceptable to the Mexicans: a pen and paper pad.

Letters to Stone should be addressed to him at Box 270, 1377 K St. N.W., Washington, D.C. 20005.



**INTRODUCING
PRIME'S
LATEST
AND
GREATEST.**

THE PRIME 9950.

THE NEWEST AND MOST POWERFUL EXAMPLE OF OUR COMMITMENT TO TECHNOLOGICAL LEADERSHIP.

When we introduced the world's first virtual memory, 32-bit supermini we set the pace for leadership that still drives our business today.

For proof we offer the Prime 9950—the most powerful, most technologically advanced computer we've ever designed.

It uses high speed emitter coupled logic—a rarity in minicomputers. Advanced pipeline architecture and unique branch cache memory allow five instructions to be processed in parallel and 255 user processes to be handled at once. 2MB memory boards allow you to economically configure systems up to 16MB. These technical advances provide the power, throughput and price/performance of the Prime 9950.

Like all Prime 50 Series systems, the Prime 9950 runs with PRIMOS, the operating system that makes it possible to easily and economically move software among all Prime systems, or upgrade your system without costly reprogramming or recompiling.

Add the reliability, availability and serviceability built into the Prime 9950 with its new diagnostic processor, and the result is a distinctive combination of a highly affordable, high performance computer, backed by the service and support you expect from a Fortune 500 company.

The Prime 9950. It's our latest and greatest technological achievement. And there's nothing else like it. Anywhere.

For more on the Prime 9950, or on the entire Prime family of compatible computers, call **1-800-343-2540** (Mass., 1-800-322-2450), or write Prime Computer, Prime Park, MS 15-60, Natick, MA 01760. In Canada call 416-678-7331. In Europe write, One Lampton Road, Hounslow Center, Hounslow, Middlesex, TW3 1JB, England. In the Far East, write Unit 1005, Tannery Block, 35 Tannery Road, Singapore 1334.

PRIME
Computer
Offices worldwide.

GETTING AHEAD IN DP/Donald J. Berardo†

How to Write an Internal DP Resume

An internal resume is a valuable communication tool that you can use to publicize your talents and advance your career. Considering the complexity of the DP environment in most corporations today, the internal resume is a good way of informing your management, user areas and others about you as a skilled, high-potential DPer.

If your company has a job-transfer system, the internal resume will keep it honest and working in your behalf. The format and content are similar to an external resume, but differ in content concentration and the breadth of applications or uses. It

is your marketing piece, your way of promoting your talents along with your performance and winning attitude. Here are some basic applications for your internal resume:

- Whenever you enter a new user area.
- As an update to your manager before appraisals.
- As an addendum to your proposals.
- As an update to your external resume.
- As an introduction to your requests for new and better assignments.
- As documentation of your pro-

gress to yourself and others.

Target each phrase, DP term and your best features toward each specific audience you hope to impress. Try to be creative and novel, but not trite or cute. Keep your internal resume within well-defined limits: three to four paragraphs with a beginning, a middle and an end, with dates bracketed at the end of each paragraph. Summary paragraphs and underscoring are acceptable.

Your internal resume should be neatly typed and without errors. Make your choice of words, both technical and descriptive narrative, as simple and interesting as you can

for each audience. Always consider first who your reader will be, and then write to provoke interest in you.

Before you compose a final draft, you might want to follow a simple outline (purpose = salary bump, transfer and new job). First, at the top of the resume, include your name (capitalized, underlined and centered) and your current salary (in brackets below your name).

Next, state your purpose (capitalize and underline "purpose"). For example: This internal resume is a brief summary of my credentials for you to consider. It is offered in regard to your posted position of DP consultant in your department. I would hope you may find this information sufficiently stimulating to warrant our meeting personally, at your convenience. Please call me (give your extension number) if your schedule will allow this.

Next, present a skill summary (capitalize and underline "skill summary"). For example: six years software/analysis, systems (Cobol, BAL, PL/I, DL/1, Basic and customized packages), IBM 370/45, OS/MVS, MVT, plus on-line or batch. Strong developmental/analysis skills for new or existing applications. Light to medium supervisory exposure, enjoy training and directing others. Excellent personal appearance, verbal skills good and can work well with anyone.

Next, present applications (capitalize and underline "applications"). For example: several business systems analysis and highly technical applications (investments, accounting, file building, customer service/billing and point-of-sale network processing). Also, many subset modules, as well as related dump/error analysis and redesign applications.

Next, list your personal traits (capitalize and underline "personal traits"). For example: quick to learn, self-starting, work alone or as a solid team member. Dedicated to DP as a career or using DP in other line or staff areas. Good intellectual grasp of DP and advanced theory and practices in the field. Enjoy additional responsibility, well organized and self-disciplined.

Berardo is a management counselor and career therapist. He is a vice-president with the Meld Group in West Hartford, Conn., publishers of a monthly newsletter on management development.

The DASI Eagle PC is a bird of another feather



Why has Data Access Systems selected the Eagle to sell, lease and service nationally?

The choice was easy. Eagle's advanced technology enables us to offer you a versatile product range.

The Eagle PC, a hardware and software system compatible with the IBM PC, has a base price of \$1995, or a DASI rental price as low as \$85 per month...including service.

The Eagle PC-2, a turnkey system which includes operating systems, word processing and financial planning software for as low as \$3495.

And if you need more, Eagle has more. The PC-XL, with 10 megabytes of hard disk storage and high resolution graphics, starting at \$4495.

An outstanding lineup. But buy your Eagle elsewhere and you're faced with searching out peripheral equipment, ordering supplies,

and then arranging on-site service contracts with different vendors. A simple business exercise that can cause administrative, purchasing and service nightmares. Our Eagles are birds of a different feather.

As the largest single source supplier in the data processing industry we offer you more than just the basic Eagle...your choice of over a hundred peripherals from major manufacturers such as Diablo, Texas Instruments, Racal Vadac, Rixon, and Digital Equipment. Fast on-site nationwide service through 22 fully stocked distribution centers.

Immediate delivery from stock. And a better way to control budgets through our rental and leasing programs.

So, if there's a small computer in your future, make it a

DASI Eagle...a bird of another feather. Call today or write for a free on-site demonstration.

- Eagle PC the perfect system for the corporate user.
- Eagle 1600 multi-user 16-bit systems that are 3 to 4 times faster than the IBM PC.
- Eagle PC-XL with 10 megabytes of storage capacity.



DATA ACCESS SYSTEMS, INC.

Coles & Camden Avenues
P.O. Box 1230
Blackwood, NJ 08012
609/228-0700 800/257-7748
in NJ 800/232-6510



Please send me more information I'm interested in a free demonstration

Name _____
Title _____
Company _____
Address _____ City _____ State _____
Phone _____

CW

District Offices:
Atlanta (404) 449-5436 • Boston (617) 769-6420 • Chicago (312) 967-0440 • Cleveland (216) 473-2131 • Dallas (214) 263-0252 • Denver (303) 337-4103
Houston (713) 682-5965 • Los Angeles (213) 532-2238 • Minneapolis (612) 854-4466 • New Jersey (201) 227-8880 • New York City (212) 564-9301
Philadelphia (609) 228-6660 • Phoenix (602) 254-1927 • San Francisco (415) 872-1811 • Seattle (206) 575-1448 • Washington, DC (301) 459-3377



'Close That Cover. You're Letting All the Memory Out!'

SPECIAL INTRODUCTORY OFFER FOR NEW SUBSCRIBERS.* SAVE \$5.00, PAY ONLY \$39.00 FOR A FULL YEAR'S SUBSCRIPTION.
(Basic Annual Subscription Rate is \$44.) *U.S. ONLY

No Other Publication Gives You SO MUCH
Timely News, Money-Making Ideas &
Management Information—**PLUS** Specials
& Bonus Issues!

As a weekly newspaper, **COMPUTERWORLD** gives you thorough and timely coverage of news and ideas of interest to computer users in industry, business, government and education. Unlike monthlies, **COMPUTERWORLD** covers hundreds of relevant news items each week. But beyond the “news” you get much more as a CW reader:

- Weekly “In Depth” articles.
- Monthly “Special Reports” on selected subjects.
- **COMPUTERWORLD BUYER'S GUIDE SERIES** . . . a comprehensive series of product-specific lists and up-to-date information on each major product area.
- **COMPUTERWORLD OA** with incisive coverage of office automation.
- **COMPUTERWORLD ON COMMUNICATIONS** covers product and system developments in the rapidly changing communications field.
- **PLUS** Other Special Issues Throughout The Year!

SUBSCRIBE NOW

Complete Form On Reverse,
Then Return In Attached
Postage-Paid Envelope. Or Use Your
Charge Card and Call
TOLL-FREE: 1-800-343-5730.

- ☐ Please enter my subscription (details on back)
- ☐ I'm already a subscriber, but I'd like you to change my:

- ☐ address ☐ title
☐ industry ☐ other

My current mailing label is attached and I've filled in new information on the other side.

Put old label or label information here



COMPUTERWORLD

Please send me COMPUTERWORLD for one year. RATES: United States \$44;
Canada, Central & South America \$110; Europe \$165;
All Other Countries \$245 (Airmail Service) Special Introductory Offer — 1. BUSINESS/INDUSTRY (Circle One)
End Users
10 Manufacturer (other than computer)



375 Cochituate Road, Rte. 30
Box 897
Framingham, MA 01701-9985

CIRCULATION DEPARTMENT

postage will be paid by

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 709 FRAMINGHAM, MA 01701

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

N. Consolidated Balance Sheet Details

December 31,
1983 1982

Assets

Trade and other receivables
Trade, less allowances
Unbilled and other
Total

\$ 720.5 \$ 710.9
445.3 467.2
\$1,165.8 \$1,178.1

Inventories
Finished goods
Work in process
Raw materials and purchased parts
Total

\$ 497.3 \$ 486.5
593.7 611.6
739.6 575.1
\$1,830.6 \$1,673.2

Finance and related receivables
Total finance and related receivables
Less: Unearned income
Allowance for losses
Net finance and related receivables

\$4,311.5 \$4,408.1
754.3 887.2
383.5 388.2
\$4,349.3 \$5,673.5

Other assets

\$ 483.4 \$ 501.9

Information

Deferred charges
Investments — affiliates
Total

593.1 587.6
435.7 405.4
\$1,512.2 \$1,494.9

Liabilities

Accounts payable and accrued liabilities
Notes and drafts

Information as Corporate Asset

By David R. Vincent

By the end of this decade, every enlightened corporation will include the information asset in its financial reports. In an internationally competitive environment, the challenge will be to optimize the value of information. By so doing, businesses will realize productivity gains and sustain their competitive edge.

The largest investment in many companies today is the creation and maintenance of information. Therefore, executive management and stockholder attention should (and probably soon will) focus on the amounts spent on this investment, the return on investment and the productivity gains to be made both

in current reporting periods and in the future.

It has been estimated that in organizations such as banks and insurance companies, as much as 25% of the organization's payroll alone is invested in creating and maintaining information needed to continue normal business operations. Therefore, it would not be unusual to see a major corporation with a total payroll of \$100 million per month investing \$300 million annually in information. This total does not include information systems, which may run another \$2 million per month, bringing the annual total up to \$324 million. Out of this total, only 7% represents the portion that

has traditionally been considered "DP." Where is this significant investment reported and analyzed?

Information economics is a discipline concerned chiefly with describing and analyzing the production, distribution and consumption of information and knowledge. Information economics will play a crucial role in large organizations that depend on information to fulfill their mission and to maintain a strong competitive posture.

In his recent book, *The Fifth Generation*, Prof. Edward Feigenbaum stated that the U.S. tax laws inhibit the development of information and knowledge technology. Actually, a more meaningful and important

IN DEPTH

change is necessary in the thinking of the economic, financial and accounting community: to recognize the asset value of information and knowledge as an inventoriable commodity in enterprises. This revelation will probably change some tax laws, but a basic misunderstanding about the value of information is the root cause of a short-term profit motivation that overlooks the value of information and knowledge.

Under current generally accepted

'Information that exists within an organization (even though it is not sold externally) can certainly be classified as an economic good if it could be purchased on an open market instead of being produced internally.'

accounting principles, there is no value ascribed to information because it is not recognized as an asset.

With this being the case, all investment made in information must be expensed during the current period,

that is, it is subtracted directly from the profit of the enterprise. Those organizations trying to maximize current profits (as most currently are after a long economic drought) will avoid investments (expenses) that are related to information.

The recognition of information and knowledge as true corporate assets has a basis in current economic and accounting theory. An asset classically has three essential characteristics:

1. It embodies a probable future benefit that involves a capacity, singly or in combination with other assets, to contribute directly or indirectly to future net cash flows.

2. A particular enterprise can obtain the benefit and control another enterprise's access to it.

3. The transaction or other event giving rise to the enterprise's right to control of the benefit has already occurred; that is, the enterprise has already made the investment, it is for exclusive use by the enterprise and it is in usable form.

There are several ways that an asset may be reported. The most common is to have a separate line item in the asset category. An extremely conservative method (for those less courageous) is to add an imputed value as a footnote to the statement, such as those that are included for long-term leases and other potential cash flow considerations. If information is included as an asset, the total assets will increase by that amount. This investment is not included in any other asset, with the exception of patents or trade secrets. The outcome would be increased net worth and profitability during the current period.

Resistance to this change comes from the accounting and economic communities, which are capital-oriented (a la Adam Smith's *Wealth of Nations*). The reason for this resistance is the difficulty in proving the relationship between information and future cash flows. One of the principles of accounting is conservatism, and a basic "show-me" attitude is the result. This attitude is not always bad, because some companies have abused accounting practices, with the resulting "surprise" to shareholders. However, in the case of information, what is needed now is ingenuity, sound economic analysis and the desire to move forward into the information era.

It will be difficult for information systems managers to lobby for such a change within their organizations without some general outside support. The financial statements are, in the final analysis, certified by a public accounting firm as to their adherence to generally accepted accounting principles. Right now, reporting information as an asset would probably be rejected. However, systems executives along with chief financial officers could work together with the American Institute of Certified Public Accountants to bring about such a

VIRTUALLY UNTAPPABLE COMPUTER NETWORKS

Codenet™ Fiber Optic Ethernet Local Area Network

Codelink™ Fiber Optic Links for Computers and Telecommunications

Codebeam™ Line-of-Sight Light Beam Communications for Inter-building LAN's, Computer and Telephone Interconnections Without Cable or Public Telephone Lines

Data Security, lower cost, easier installation, noise immunity, longer distance transmission without repeaters, smaller size, reduced weight; all reasons why you should consider Codenet™ fiber optics and Codebeam™ Line-of-Sight Light Beam Communications for your Local Area Network, computer network or telephone system.

Codenoll's complete line of fiber optic networking products enable quick, easy, cost effective installation of high performance, high reliability Local Area Networks.

Codenet Fiber Optic Ethernet LAN — Our Codenet™-2020 Transceiver is compatible with Ethernet LAN interface equipment through a standard 15 pin transceiver cable. Together with the Codestar™ passive star coupler, it is what you need to have a fiber optic Ethernet LAN.*

Interconnect Buildings Without Cable or Telephone Lines using Codebeam™ — For inter-building LAN's, computer networks, and telephone systems, the Codebeam™-20 Line-of-Sight Light Beam System can link your networks without any cable or public telephone lines over distances up to two kilometers. Since the signals are light beams, no (microwave) licenses are required.

In addition to a Codelink™ fiber optic interface, it can handle Ethernet,

RS-232C, RS-422A, V.35 and many special interfaces such as the DMR-11 for connecting DEC VAX and PDP 11 computers,** as well as T-1, T-1C and T-2 telephone equipment.

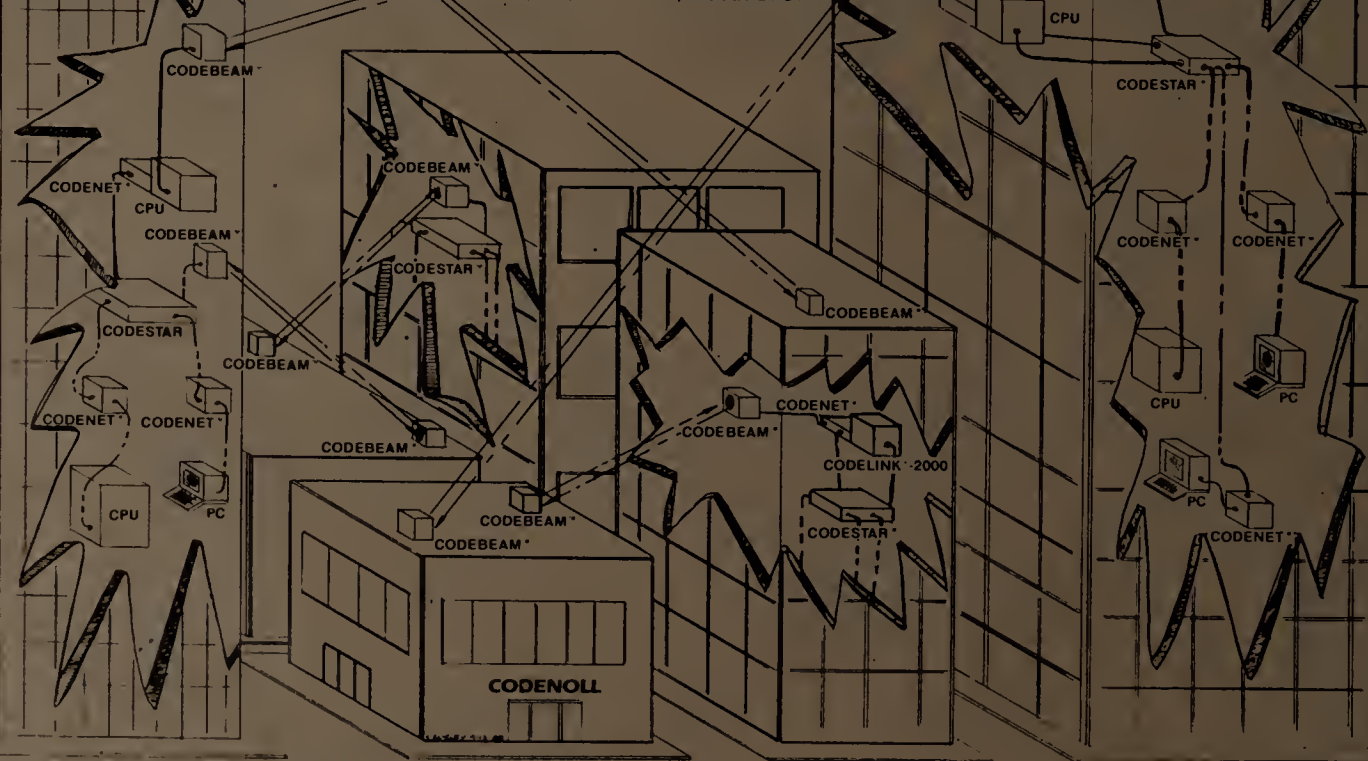
Flexible, Modular, Expandable — The Codelink™-2000 Modular Optical Communications System enables you to set up fiber optic links between virtually any kind of data and telecommunications equipment. It is available in rack mount and desk top units that are perfect for computer rooms and remote DTE Interconnects or anywhere you would use a limited distance modem.

Before You Make Any Decisions About A LAN, Computer Network Or Private Telephone System, contact Codenoll's applications engineers. They can give you information on Codenoll's fiber optic and Line-of-Sight Light Beam Communications products, as well as application assistance for your Network Design.

*For OEM military and ultra high security applications, Codenet™-2020 hybrid integrated circuit chip set is available for integration directly into the computer equipment with the only external connections being fiber optic cable. The Codenet™-2020 Transceiver unit is currently being tested for NACSIM 5100A Tempest qualification.

**DEC, VAX and PDP-11 are Trademarks of Digital Equipment Corporation.

See these networks demonstrated at:
Local-Net — New York, NY, Sept. 28-30, Booth 8
FOC/LAN — Atlantic City, NJ, Oct. 11-14, Booths 45 & 54
Wescon — San Francisco, CA, Nov. 8-11, Booth 3707



TO Codenoll Applications Engineers: Please send me information on:

- ☐ Codenet™ Fiber Optic Ethernet
- ☐ Codebeam™ Line-of-Sight Light Beam Communications
- ☐ Codelink™ Computer and Telecommunications Links
- ☐ Codenoll's 3 day course on Fiber Optics and Optical Communications.

My application is: ☐ END USER ☐ OEM ☐ DATA ☐ TELEPHONE
☐ COMMERCIAL ☐ MILITARY/GOVERNMENT

☐ Please have an Applications Engineer call:

Name _____ Title _____
Company _____ Phone _____
Address _____
City _____ State _____ Zip _____

**CODENOLL
Technology Corporation**

1086 North Broadway, Yonkers, NY 10701
Telephone (914) 965-6300 • Telex 646 159

change. It would ultimately result in a statement from the Financial Accounting Standards Board (similar to the recent pronouncement on accounting for gains and losses in foreign currency translations).

Information Commodity

Economic theory defines a good or commodity as something useful or valuable, especially when it is an item of commerce that can be sold and delivered for shipment. Information commodities such as mailing lists, research reports, market studies, patents and trade secrets are regularly sold or licensed as well as delivered after the sale. Medical and legal libraries have been developed and automated so that they may be offered for sale or lease as an ongoing and profitable service. An example of such a system for medicine is Internist/Caduceus, developed at the University of Pittsburgh, which covers more than 80% of all internal medicine, including about 500 diseases and 3,500 manifestations of those diseases.

An example of a legal system is a library named Weslaw developed and sold by the West Publishing Co. in St. Paul, Minn. Lawyers can have this system prepare entire briefs for them by entering the subject area from remote terminals. Such valid and real economic information commodities certainly meet the above criteria for an asset.

Information that exists within an organization (even though it is not sold externally) can certainly be classified as an economic good if it could be purchased on an open market instead of being produced internally. Mailing lists that are purchased instead of created are an example.

Because of the specific nature of (and the security factors surrounding) internally created information, the possibility of purchase may be obviated, but this fact does not diminish the book value of the information. Accepted accounting practice allows for this situation by providing that an asset may be valued at cost or market, whichever is lower. If there is no market price, then cost is used as the financial value.

Accounting Implications

The classification of information or knowledge as an asset implies that there is a

method for determining its cost as well as its value and useful life. The data processing "accounting" community has developed numerous methodologies, techniques and "DP cost accounting"

software packages designed to allocate processing costs to the users of DP services. The result has been complicated reports of DP "standard costs" and chargeback rates to the system's users. In fact,

none of these methodologies or techniques reflects the real nature of information systems costs today.

It is imperative that information be recognized as the major resource, not the data

processing hardware and software used to make it available. With this recognition, the true costs of information can be calculated, including the investment in information systems as well

MEMOREX

Just the facts: Why your next system 34/36/38 terminal should be a Memorex.

When you're good, you don't have to shout. We think our System 34/36/38-compatible family of display stations and printers is the best you can buy. So, to prove our high opinion, a few quiet facts:

Plug-compatibility with IBM's entire 34/36/38 series. Plug Memorex terminals in and protect your existing investment.

Monitors that make a difference:
Crisp, high resolution characters.
Choice of easy-to-read green phosphor or new amber screens.
Ergonomic design for increased productivity.

Economy in operation. Our display stations use up to 68% less power than their largest competitors. And automatic dimming extends the useful life of internal components.

Available when you need them. Many items are available immediately. Let our sales network, the Memorex Authorized Marketers, speed your order through.

Service that spans the globe. Quality computer peripherals and media for over 22 years. And the best in back-up service anywhere.

Call today for more information and the name of the local Memorex Authorized Marketer nearest you. Our toll free number is (800) 222-1150; in California (408) 996-9000, Ext. 616. Or write to Memorex Marketing, 18922 Forge Drive, Cupertino, CA 95014. Once you've got all the facts, we're confident of your decision.



MEMOREX

A Burroughs Company

IN DEPTH

as the investment in information. This calculation would include (as a minimum):

1. Creation costs, which are primarily labor as well as that portion of information systems used in the process. The labor element is substantial, especially in those enterprises involved in financial services, banking, insurance, communications, transportation and consumer marketing.

2. Maintenance costs, including the updating and purging of information.

3. Production costs, including the information systems costs, labor costs and communications expenses required to make the information available when, where and how it is needed to serve the purpose of the enterprise.

Traditional cost accounting principles were developed in the manufacturing environment to account for variable material, labor and overhead costs on a unit-of-manufacture basis. In the factory, material is neither ordered nor used unless there are units to produce. If the material is on hand but is not needed for production, it is inventoried as an asset.

Likewise, labor is not used unless there are units to produce. A lack of production need results in immediate layoffs to avoid unnecessary labor expenses, or, in the worst case, some units are produced and inventoried, including the labor expense as a part of the inventory asset. There are some fixed costs that will accrue in any event; these typically are not inventoried and may contribute to lower profits in low production periods.

In the information systems environment, the variable costs are few. Labor is not treated like factory labor; since short-term layoffs may result in permanent employee loss, such layoffs are not typical. Other variable costs such as removable storage media, paper and electricity are such a small part of the total information systems cost that they are not considered major factors in the information investment. All the remaining systems costs are relatively fixed (hardware, software, development and operations staff, facilities and management). Furthermore, some of these fixed costs grow at an annual rate of 20% to 60%, depending on the type of enterprise.

Along with the information systems investment growth, other information investments are also increasing at an accelerated rate because of the productivity gains resulting from in-

creased systems availability. A good example is the emerging concept of the information center along with executive workstations.

Management acceptance of this kind of information

expense growth rate will come only from a clear valuation process that relates the investment made in the information asset to expected financial return (in terms of future increases in revenue

or future decreases in expense that will result in incremental profit). From this valuation process, the return on investment (ROI) may be calculated and the responsibility for ROI achievement



Building On Naturally Superior Architecture.

The Cellular Perspective.

Over the past fourteen years, Beehive has gained a unique point of view on terminal systems. By focusing all our efforts on that all-important window into your system. By delivering technology to thousands of terminal users throughout the U.S. and over 40 nations abroad. By creating design classics, then improving upon them.

The result brings a new era in Terminal/System design. Elegant in simplicity. Meticulous in construction.

Currently, Beehive is shipping some of the most advanced terminals in the industry, including emulators for IBM and Burroughs. In addition, we continue to advance the state-of-the-art with new developments in microprocessor computing systems.

Share our perspective and make Beehive the architect of your success.

**The Terminal/System
Architects**



BEEHIVE™

assigned. The next logical step is the capitalization and amortization of information costs over a period of time equal to their benefit or useful life. These costs could then be reported in the en-

terprise's financial statements just as any other asset. The audit criteria for this asset would be similar to those used for accounts receivable — that is, documented as to their accuracy, verified and

related to future cash flows.

If an item is reported as an asset, a useful life must be determined and some method of matching the cost of the investment to the generation of future cash flows

must also be implemented. In the case of asset accounting, investment costs are capitalized by an accounting entry, with this amount amortized or depreciated over an appropriate period

of time. An example is the acquisition of a CPU, which may be expensed over a four-year period. Some assets, such as buildings, are amortized over a much longer period of time. Improvements or additions to the assets may be added to the value of the asset, with a commensurate amortization schedule.

In the case of information, even though the initial useful life may be determined to be three or four years, the actual value may be increased by added information and information "maintenance" that would in effect extend its useful life.

The audit criteria are simple: Is the information accurate and not generally available? Can its value be related to the generation of future cash flows? For example, computerizing information obtained from the Bureau of the Census might be regarded simply as automating public information; this information would have no specific asset value, since it is not the exclusive property of the organization.

However, by analyzing the information and adding other data, this information might become unique and usable for generating future cash flow. The audit must determine whether this is the case. The audit might include some statistical sampling to evaluate the accuracy of the data as well as its availability from some public source.

Hardware, Software Costs

One source of confusion should be put to rest: How should the hardware and software costs of information systems be treated? It should be evident that as processing technology advances at a geometric rate, the hardware portion has a shortened life cycle and should probably be considered as a throwaway kind of asset (similar to an automobile).

After the hardware has served its useful life, which may be predicted on an obsolescence curve, its only residual value is scrap. For example, it is no accident that when IBM makes a piece of equipment financially attractive to purchase, as opposed to lease, that equipment is usually toward the end of its useful life.

A case in point is that IBM, over the past three decades, has optimized the production of each generation of its computers on four-year

First We Emulate, Then We Enhance Your Burroughs Or IBM System.

Beehive manufacturers terminals for the most demanding customers in the world—computer system OEMs. For fourteen years, we've met their tough requirements for superior price/performance, high reliability, responsive service and fast delivery.

Now, we're putting this experience to work for you with Beehive terminals for the system user.

The Terminal/System Architects.

We start by finding a system worth emulating, then design our terminal to be completely compatible in hardware, software and operating procedures. Next, we improve on the design by creating special enhancements.

Soft function keys are a prime example. On many Beehive terminals, they let you configure the ter-

terminal to your needs, often reducing complex commands to a single keystroke.

Some IBM Specifics.

Our terminals emulate IBM 3275/3276, 3101 and 3278. The unique Beehive TOPPER™ is in the latter category. On-line, it's a versatile telecommunications console and RJE station. Off-line, TOPPER works like an advanced personal computer. There's nothing else like it in the IBM world.

Also, we bring new flexibility to 3270 networks with the Beehive CC76™ cluster controller/protocol converter. Here's a dramatic way to cut the costs of modems, printers and cabling.

Brightening The Burroughs Environment.

Our DM83 terminal emulates Burroughs TD830/MT983. System efficiency is enhanced through a

proprietary TCM™ (Terminal Configuration Manager) that lets the operator set up screen handling, communications and peripherals from the keyboard. Sixteen function keys provide easy local storage of downloaded data, cutting communication costs. And multiple terminals can share a common printer.

Make The OEMs' Choice Your Choice.

All this and the outstanding reliability and solid service support you expect from a supplier of quality terminals. Find out how we can enhance your system by calling Toll Free 1-800-453-9454, or contact: Beehive, 4910 Amelia Earhart Drive, Salt Lake City, Utah 84125.



Sales Offices:

CALIFORNIA Costa Mesa 714/540-8404
Sunnyvale 408/738-1560
FLORIDA
Altamonte Springs 305/788-9000
ILLINOIS
Arlington Heights 312/593-1565
MASSACHUSETTS Woburn 617/933-0202
MISSOURI Independence 816/356-4402
NEW JERSEY Colonia 201/381-9883
NORTH CAROLINA Greensboro 919/854-2694
TEXAS Dallas 214/239-3330
UTAH Salt Lake City 801/355-6000
WASHINGTON, DC (VA) Falls Church 703/573-1261

IN DEPTH

cycles. Every four years, IBM announces a major line of processors, thereby rendering the previous generation obsolete (or at least significantly reducing its residual value). The 30 series of CPUs was announced in 1980, with production shipments geared up in mid-1981. It can therefore be inferred that, given its cyclic history, IBM will announce a new generation in 1984, with major shipments in 1985.

Recent announcements from IBM

'Information systems specialists such as capacity managers and data base administrators have been responsible for system response time and "performance," applying minimal thought as to what information needs are being satisfied.'

concerning its 30 series (especially the 3083, which is a version of the 3081) have indicated a significant re-

duction in the purchase price and, at the same time, a significant increase in the lease price. On this basis, does

it make sound financial sense to purchase a 3083?

Technological Shifts

The current shift in information systems is moving away from software engineering to information engineering. This shift is taking place because more emphasis is being placed on what is done with information rather than how it is done. The term "software engineering" refers to the set of disciplines used for specifying, designing and programming computer software, including applications as well as operating and subsystem software. Until recently, this subject has commanded the attention of information systems technicians, but it is now dwindling in demand as a percentage of the total effort.

The term "information engineering" refers to the application of information economics, by which the properties (including stability) and sources of information are made useful to people. In this case, "people" may include expert or knowledge-based systems that make decisions as people would, provided that they are supplied with appropriate information.

The primary focus of the information engineering activity is the information and knowledge that are stored and managed with information systems technology. The result is the supply of information where it is needed to perform the functions of the organization being served. As opposed to information engineering, software engineering is primarily concerned with the internal logic that is used in the information systems process.

Systems and applications programmers have been concerned primarily with software engineering and only slightly with information engineering. Until now, information systems specialists such as capacity managers and data base administrators have been responsible for system response time and "performance," applying minimal thought as to what information needs were being satisfied. With a new emphasis on information economics, these parties will be more concerned with information as it relates to the organization and the society it serves.

As hardware and software vendors increasingly automate the process of software engineering, they make possible the shift from applications programming as a centralized and specialized process to one that can be handled by decentralized information systems users. Examples of such user-controlled systems are executive workstations (basically personal computers) that can run such complex programs as Visicorp's Visicalc and Lotus Development Corp.'s 1-2-3 and information centers that offer fourth-generation languages for the "non-DP" user.

Again, time will affect the course of this developing concept of

New From Telex

Introducing PROFFIT™ The Business Computer for 3270 Networks

Now there's a PROFFIT able way to combine your 3270 network with the increasing need for local business computing. Telex's new PROFFIT (PROfessional OFFice Terminal) attaches to a Telex 278 display. Together, PROFFIT and Telex's 278 provide users with concurrent access to host and local processing with a single keystroke—unlike other systems which require involved log on and off procedures.

PROFFIT Features Include:

- 5 1/4-inch single floppy diskette with a 160K of storage

- expandable to 320K with an optional second disk.
- CP/M-86® operating system.
- 128K Main Memory expandable to 640K.
- Word processing, spreadsheet application, and a full screen editing program are available and fully supported by Telex.

PROFFIT from Telex. Your answer to expanded 3270 capabilities and local site control of data processing requirements.

For more information, call John Hawkins, toll-free, 1-800-331-2623.

CP/M-86® is a registered trademark of Digital Research, Inc.

The Innovation Continues... TELEX®

Telex Computer Products, Inc. Terminals/Peripherals
6422 E. 41st St., Tulsa, OK 74135 (918) 627-1111

centralized information with decentralized processing and applications.

Reexamining Activities

As previously stated, the cost of information systems, although a significant investment, is only part of the much larger corporate investment in the information asset. Information coordination and management activities that will fall under the aegis of the person who is currently called the vice-president of information systems (soon to be called the chief information officer) include:

- Storage of the information asset.
- Management of the information data base.
- Information processing.
- Information transfer.

With users' heightened desire for quick response time and local control over the manipulation of information, it will become even more popular to process information locally, with files coming from a central source. Then it will be necessary to ascertain the relevant costs and benefits of centralized vs. decentralized processing.

Decentralized processing and centralized information may result in a central facility almost as big as that in the case of centralized processing just to handle the storage and data base management systems. However, the alternative of decentralizing both storage and processing brings into play another set of issues: accessibility, security and control of the information asset.

With either centralized or decentralized processing, information economics will help to resolve such issues by applying sound economic and financial analyses to determine which alternative(s) will optimize the long-term value of the information asset. These analyses will take into account costs such as:

- Information security and control.
- Measurement and planning costs.
- Documentation and training.
- Systems integration and communications compatibility.
- Information stability and redundancy.
- Maintenance of central data base integrity; that is, all files are documented, and all updates and changes are reported and controlled by management.

Whether a data base is centralized or decentralized, information transfer will be one of the major information costs of the future. Even though the advent of low-cost, shippable optical disks may provide some temporary relief, the data base concerns of integrity and currency may still present an obstacle to their use for many on-line applications.

Characterizing Activities

The characteristic behavior of each of the above areas of information activity is unique.

In order to control, plan and measure the results of each activity area, some uniform metrics are vital to ensure information management success.

Some guidelines are offered in the table below for describing the salient characteristics for each information activity area. A metric for each area is set forth. In some cases, the indicated

metric is the same — for example, bytes or time. But since each area is unique, the metrics have different connotations depending on the activity being measured. Therefore, the same measures for different areas should not be added to represent a composite sum for overall information activity (as has been done by some practitioners using measures such as software physics "works," computer resource units, MVS service units and the like). Such overall

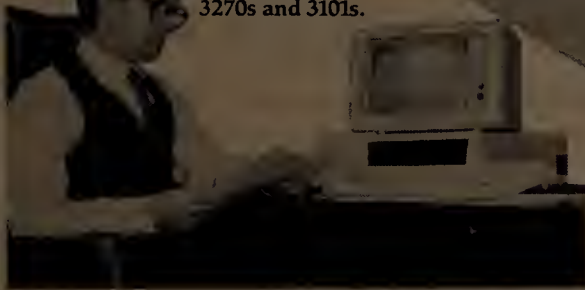
Metric	Storage	Management	Processing	Transfer
Basic	Space	Time	Time	Time/Distance
Alternate	Bytes	Bytes	Bytes	Bytes/Distance
Other	Media	System	Peak/Time	Peak/Time

Information Resource Characteristics

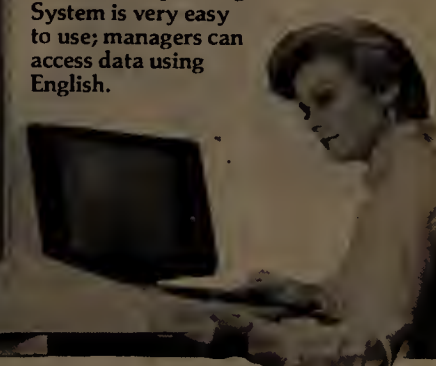
Announcing the PICK™ OS on IBM 4300

Hundreds of applications software packages—serving cross-industry and vertical markets—are now available to IBM 4300 users. Why? Because of the implementation of the PICK Operating System on the entire 4300 Series, including the newly announced, powerful IBM 4361 (models 4 and 5).

The 4300-PICK communicates with your IBM PCs, 3270s and 3101s.



The PICK Operating System is very easy to use; managers can access data using English.



a whole new world of applications software

In addition to bringing an array of field-proven software packages to the IBM 4300 marketplace, the PICK Operating Software provides the following advantages, never before available to the large-end market:

- Supports a large, on-line network with minimal degradation in response time
- Communicates with your existing IBM Personal Computers, and IBM 3270 (bisynch) and 3101 (asynch) terminals
- Allows non-technical personnel to easily access information using ordinary English
- Conserves valuable computer resources by using a virtual memory manager and variable length records and fields
- Provides relational data base efficiency
- Provides data/system security for tight control of information

What's more, PICK on the entire 4300 Series is available not only in native mode but also under VM. Thus, you can keep your existing data and programs, and still add the benefits and software packages available with the PICK Operating System.

For detailed literature call today.
800/323-1143



Systems Management, Inc.
6300 N. River Road, Rosemont, IL 60018
800/323-1143 (in Illinois, 312/698-4000)

Over 10,000 PICK installations are enjoying these benefits today. It's no wonder that a recent Business Week article referred to PICK as "the best-kept secret in the computer industry." Find out today how PICK can help you maximize your investment in the IBM 4300.

The 4300-PICK works with VM or in native mode.



For a free directory of available software, or for an evaluation program on the IBM 4300 with PICK under VM, call or write Judi Gennetti at Systems Management, Inc. SMI is currently the only IBM VAR (Value-Added Remarketer) with rights to the PICK Operating System on the IBM 4300 Series.

PICK OS and PICK Operating System refer to Operating Software by PICK SYSTEMS™, a registered trademark

See us at INFO '83 Booth 4201
COMDEX Europe Booth 1338
COMDEX/Fall Booth 286

IN DEPTH

measures may produce some "interesting" analyses, but adding across activity areas obfuscates their unique aspects.

The confusion that might occur from adding like but unique elements can be illustrated by the labor required to construct a building. In order to construct a building, there must be an architect, electricians, carpenters, bricklayers, metalworkers and so on.

The efforts of all of these people

'Clever people can think up algorithms to explain system behavior with composite statistics, but information managers and users will not be able to understand them or use them in making important decisions regarding information systems investment.'

are measured by time (hours, man-years and the like). The simple statement that a building will require

1,000 man-years of construction time will not be usable for any kind of planning or management process.

The types of unique resources must be specified individually: electrician man-years, bricklayer man-years, architect man-years and so on.

Clever people can think up algorithms to explain system behavior with composite statistics, but information managers and users will not be able to understand them or use them in making important decisions regarding information systems investment.

Such traditional, nonmanagement-oriented algorithms often appear in capacity management reports that dwell on percentages of CPU utilization. In today's on-line environment (in which CPU utilization statistics do not correspond directly to speed of service), what kinds of decisions can be made with that kind of information?

Storage Costs

The costs for information storage should be associated with the type of media used (tape, disk, mass storage) as well as the space occupied. The metrics of bytes or space are both quantity measures. For the purpose of this discussion, it really doesn't matter which metric is used. What does matter is how to relate the investment made in storage to how it is used to satisfy user information needs and, as a corollary, what it is worth to the user.

Information data base management costs should include all the information systems resources needed to get information into and out of storage. The kinds of systems resources used include CPUs, disk and tape devices, controllers and various software and operating subsystems. The important thing is that the data base management costs be associated with the time that an I/O subsystem is used, that a device is used or, with the advent of cache memory devices, that cache memory is used. This would apply to such media as mass storage or tape devices. These costs are systems costs, as opposed to the physical storage space for information. These costs are related not to the space consumed but to the resources required to place information in storage and then, later, to find and retrieve that information in the same form.

With the focus on the storage of information, the management processes of planning, implementing, measuring and modifying can begin. If an organization wishes to survive in the information age, it must first have an overall organizational strategic plan for the creation, automation, storage and security of information. In an environment where this plan does not exist, information systems capacity planners will never be able to provide properly the optimal amounts of storage media at the best economic benefit to the organization.

One of the major planning problems in large organizations revolves

"Divestiture has created an unparalleled need for innovative information management strategies and products. We believe DMW can provide the solutions."



—Dr. Dixon R. Doll / President and C.E.O. The DMW Group, Inc.

PRODUCTS

TELECOST™

A comprehensive information management product that helps you monitor, control and allocate your telephone usage and equipment costs...efficiently and productively.

TOP™ (Teletraffic Optimizer Program)

Produces optimized voice network configurations by processing actual call traffic data.

Data from the usage of WATS, FX, DDD, tie-lines, and other specialized carrier offerings is processed in combination with parameters such as tariffs, queuing options, ARS patterns and other control alternatives to design the lowest cost configuration which meets your required service levels.

NetWorker™

Our newest product offering that provides the data communications planner an interactive tool to design, optimize, and manage the complex network environments that will characterize the 1980's.

SEMINARS

DMW's seminars and conferences are designed to provide you with cost-effective, practical solutions for managing your information and communications resources.

Schedule:

- "IBM Directions in Communications, Office Systems and Personal Computers"
New York, October 10-11
San Francisco, January 12-13
- "1984 Impact of Divestiture on Users and Vendors"
New York, October 25-26
Chicago, November 14-15
San Francisco, January 10-11
- "CBX Evaluation and Selection"
New York, October 27
Chicago, November 8
- "Office Systems and the Role of the Personal Computer"
New York, November 7-8
- "World Update '84"
New York, November 9-10
San Francisco, November 16-17
- "Telecommunications Strategic Planning Methodologies"
New York, December 1-2
- "Data Communications Network Planning, Analysis, and Design"
Amsterdam, October 10-14
Ann Arbor, December 6-7

MAIL THIS COUPON TO:

The DMW Group, Inc.



Telecommunications & Information
Management Professionals

The DMW Group, Inc.

Attn: Vice President of Marketing
2020 Hogback Road, Ann Arbor, MI 48104
Or Call: 800-521-7802 (In MI: 313/971-5234)

Please send more information:

☐ Seminars ☐ TELECOST ☐ TOP ☐ NetWorker

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Telephone () _____

The only microcomputer show designed exclusively for business and professional users.



**NO GAMES. NO TOYS. ALL BUSINESS.
GET THE INFORMATION YOU NEED AT
EMCE LONG BEACH.**



To register for one of these free computers, enter your name at the *InfoWorld* booth.

Wednesday, Thursday, and Friday October 5-7 Long Beach Convention Center

It premiered in New York this June, and now it's the only major microcomputer show in Southern California this fall. It's EMCE. And it's designed exclusively for you.

See the Latest Microcomputer Hardware, Software and Services.

A complete selection of microcomputer systems, business software, packages, printers, monitors and other peripheral equipment as well as computer accessories and related equipment and services will be on display at EMCE, giving you a unique opportunity to gather the information you need quickly and efficiently.

Get Hands-On Demonstrations

of the latest equipment at exhibitors' booths. EMCE is not the typical, crowded computer show loaded with kids and hobbyists, so you'll have time for hands-on demonstrations of the products that interest you. And you'll have a chance to get your questions answered.

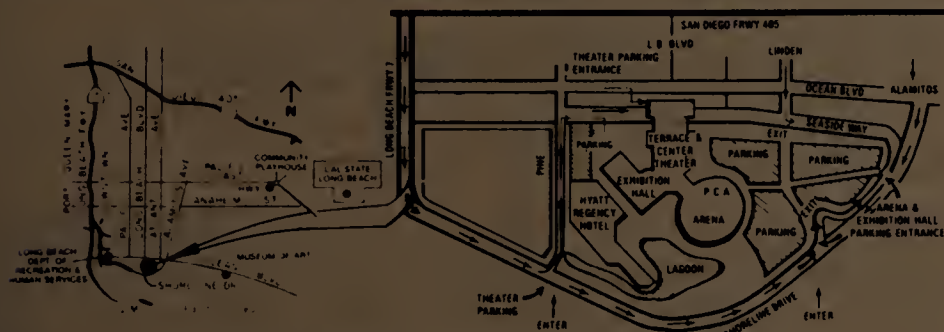
Attend a conference session of your choice — FREE.

When you register for EMCE exhibits with the coupon below, you'll get a free ticket for any one of our more than 20 conference sessions on Thursday or Friday. (To register for the complete conference program, or get more information, just call 1-800-225-4698.)

Win one of three microcomputers from *InfoWorld*.

Three Morrow Micro Decision (MD3) computers will be given away at the *InfoWorld* booth during EMCE. The Morrow is the complete desktop system for small businessmen and professionals. And it is more than just a great hardware value. It also includes great software: WordStar word processing, Correct-It spelling checker, and LogiCalc, the spreadsheet that helps you forecast the future.

HOW TO GET TO EMCE LONG BEACH



Long Beach Convention Center
300 East Ocean Blvd. • Long Beach, CA 90802
10 AM to 6 PM
Wed., Thurs., & Fri. - October 5, 6, 7

EMCE Long Beach is sponsored by - CW Communications/Inc., publishers of *Computerworld*, *InfoWorld*, *ISO WORLD*, *PC WORLD* and the largest most respected publisher of computer-related newspapers and magazines in the world.

SAVE \$5.00

on \$10.00 EMCE Exhibits admission

You can use this coupon to save \$5.00 on admission to the EMCE exhibition. Your total fee is only \$5.00. This coupon is also good for your FREE conference session.

EMCE
Executive Microcomputer
Conference & Exposition

Get a free, no-lines tour of the Spruce Goose.

The largest plane ever built has been reserved for special showing to EMCE attendees on Wednesday and Thursday evenings from 6 to 8 PM. No lines. No charge. Just pick up a free ticket at any EMCE exhibitor booth.

There isn't another in the world able to as advanced as For five go

1. The Millennium environment is borderless.

Unlike any other company's software packages, Millennium packages aren't walled off from each other by separate programs and commands. So you can cross instantly from one system to the next. You can ask a question in general ledger, immediately seek an answer on-line in accounts payable, and follow the track wherever it leads. Into fixed assets, purchase order management, anywhere. While traditional packages force you to work within the narrow confines of a given application, Millennium creates a limitless environment that enables you to access applications at will. With a single key, you're free to explore the vast entirety of your information universe. No other system works like Millennium, except your own mind.

2. Millennium has common functions across all applications.

Let's say you have a half dozen different packages. General ledger, accounts payable, and so on. In the

past, that meant doing everything a half dozen times. Learning the different programs and commands for each application. Training users in data entry procedures for each one. From a training and service standpoint, Millennium is infinitely less complicated because the same set of functions governs all applications. You use, for example, the same real-time update procedures for accounts payable as fixed assets. Functions never change, only the data that defines the particular application. Once you learn one set of functions, you've learned them all. And you quickly find you're faced with a much lighter load of training, documentation and support requirements.

3. All Millennium systems are real-time, on-line.

Working in the borderless environment, you perform routine file maintenance on the spot as you cross from system to system. You can update fields, records or any other information in your files instantly. There's no waiting for batch processing. You get accurate, up-to-

software company give you anything Millennium. od reasons.

the-second information the moment you need it.
Today, not tomorrow when it's too late.

4. All Millennium systems are secure and friendly.

Although Millennium is borderless, the security is tighter than any border patrol. Totally comprehensive and user defined. You can set up any restrictions you want, right down to the field level.

Even the on-line HELP feature in Millennium is user-defined. Not only do you get comprehensive on-line documentation from McCormack & Dodge. But you're able to enter your own specific instructions and requirements on-line into the HELP data base, exactly the way you want them. This gives you complete flexibility to define corporate policies and procedures.

Millennium has a special ScreenPaint function that lets you design your own terminal screens quickly and easily. You can see and use your new screen format in a matter of seconds.

5. Millennium offers an interactive PC link.

This gives you an enormously powerful and effective managerial tool. Without leaving your desk, you can open up your mainframe to the analytical powers of your personal computer. You can selectively download specific data from the mainframe and study it, manipulate it and graph your results. When you've finished you can upload the data back to the mainframe in minutes.

Clearly, Millennium is the software of tomorrow. But only McCormack & Dodge can install it today.

Introducing Millennium. Tomorrow's software today.

- | | |
|---|--|
| ☐ General Ledger | ☐ Payroll/Personnel |
| ☐ Accounts Payable | ☐ Purchase Order Management |
| ☐ Fixed Asset Accounting | ☐ Capital Project Analysis |

1-800-343-0325*

*Telex 174002

McCormack & Dodge

DB a company of
The Dun & Bradstreet Corporation

support offices throughout North and South America, Europe, Asia, Australia and Africa.

IN DEPTH

around the size of the facility to house information systems. An embarrassing, but very familiar, phenomenon is the situation in which the facility space requirements exceed the physical capacity of the new, and much celebrated, data center.

Hardware vendors have done much to reduce the space taken by a processor, but if the 3380-type disk drive devices are any indication of the space requirements for storage,

then the information systems community is in for a hard time.

Fortunately, optical disk storage technology is expected to take significantly less space once the laser mechanics are worked out.

The information systems effort in the data base management area will likewise present a real challenge. The information resources to be planned and controlled will include the largest CPUs.

The systems community is now

awaiting the announcement of uni-processors that will handle 50 million to 100 million instructions per second. The Japanese are planning systems many times larger as part of their fifth-generation project for knowledge and information processing systems that can process 100 million to one billion logical inferences per second.

These processors will not be used for doing a greater amount of batch and on-line work. Rather, they will

manage the vast amounts of information that will be stored for use by knowledge-based systems.

Security, data integrity and performance are key issues for this area, along with such items as relational data bases, data dictionaries and the enforcement of information handling standards throughout the organization. These standards will necessitate ensuring that little pockets of "private" information are not held back from the organization's data bases.

This practice is analogous to setting up little bank accounts with corporate money at various remote locations to squirrel away sums for "just-in-case" situation. The corporate treasurer is responsible for ensuring that these kinds of things do not happen to corporate funds. The chief information officer assumes this same kind of responsibility for the company's information. But carrying out this responsibility is going to be one of the major challenges of the next 10 years.

With the availability of local processing, the appetite for information will increase. Since it will not be practically feasible, or even desirable, to maintain large local data bases, information transfer between the central facility and remote locations will demand more and more of the capacity planner's attention. This function, at present, is delegated to a network or communications department, often located at a very low organizational level.

Since the job of making the information asset available represents one of the most crucial areas of information systems responsibility, the information transfer function should be an integral part of the corporate capacity management staff. Again, important organizational decisions regarding the investment in telecommunications equipment and service will be required. Many organizations will invest in their own satellite systems to provide the information transfer speeds necessary to meet their organizational goals for productivity and return on investment.

In the final analysis, it is the expeditious use of information and a comprehensive understanding of its value in each area of business activity that will result in sorely needed gains in productivity. Organizations with this understanding will be the corporate winners in the information age.

About the Author

David R. Vincent is currently vice-president of Boole & Babbage and general manager of the Institute for Software Engineering in Sunnyvale, Calif. Previously he was general manager of Boole & Babbage's Educational Services Division and product marketing manager.

Vincent has written articles on service-level management, DP operational standards, data center management and DP technical and economic trends.

TOP OF THE LINE COMPUTERS FOR BOTTOM LINE RESULTS.

We have more ways than one you can make the bottom line look good.

We have thousands of proven business application programs developed specifically for Basic Four computers. So, you get more than computers, you get solutions.

We have one of the top microcomputer systems on the market—for under \$5000. On up to a system that can handle as many as 64 terminals, printers and other peripherals. So, you can get the right computer at the right price.

Best of all, we help you protect your investment. Because, as you expand, you can add to any Basic Four system by simply building onto your existing hardware and software.

Which is why, for over a decade, companies using Basic Four computers all over the world have agreed: Any computer system that can do this much for the bottom line, is at the top of theirs.

MAI/Basic Four, Dept. 350, 14101 Myford Road, Tustin, CA 92680.




```

SUMELSEPERFORM1200-SUM-INMOVE'17'TOOUTPUT-ERR-SW.IFAAA-PRJ-VALUE = TOT-PRJ-VAL
CC-PRJ-VALUE = SAVE-PRJ-VALUEIFAAA-NU-MNOT = 'L'IFAAA-KEY = SAVE-KEYPERFORM1266-SU
A-TABLEPERFORM1255-PRINT-RETRYELSEIFAAA-KEYGREATERTHANSAVE-KEYMOVETOT-AAA-V
TEMP-AAA-HOLDPERFORM1255-PRINT-RETRYPERFORM1266-SUM-TABLEELSEIFAAA-KEYLESST
SAVE-KEYPERFORM1255-PRINT-RETRYPERFORM1266-SUM-TABLEELSENEXTSENTEN-CEELSEP
ORM1230-GET-TBLPERFORM1135-AAA-SUMELSEPERFORM1260-SUM-INPERFORM1210-SETUP-FUN
RAYELSEIFAAA-PRJ-VALUEGREAT-ERTHANSUM-PRJ-VALUEIFSUM-PRJ-VALUE = SAVE-PRJ-VA
IONTESM-AAA-UNFOUNDED-AAA-HOLDPERFORM1266-PRINT-RETRYMOVETOT-AAA-HOLDPERFORM

```

September 26, 1983

IN DEPTH

about, software quality is still dubious and, most significant, maintenance costs are rising steadily.

It is interesting to note how the total sins of poor analysis, absence of design, low-quality code and almost nonexistent testing were blamed on the GOTO instruction. We read, "Get the GOTO out of your programs and the problem of poor software and heavy maintenance is sure to go away." Oh, what a relief it would have been.

'It is ironic that the increased programmer productivity (often measured as the ability to write code faster) in many cases actually added to the maintenance problem.'

It was amusing to see author after author (most of them never having written a "real" program, let alone

having maintained one), teacher after teacher and hordes of newly ordained "structured programmers"

join the GOTO-less bandwagon and extol the virtues of their new-found belief in deeply nested IFs. Next, if one would be so smart as to include a heavy smattering of PERFORMs, nirvana would be upon us.

Plunge Postponed

The illusion of the structured solution was shattered when the newly developed software (erroneously believed to be well-engineered) was put into production and maintenance costs did not take the must-awaited plunge.

It is ironic that the increased programmer productivity (often measured as the ability to write code faster) in many cases actually added to the maintenance problem. Figure 1 is an example of such "structured code." This example was extracted from an original routine consisting of 97 lines.

This, mind you, is a single sentence, 50 lines long. It contains enough nested IFs and enough PERFORMs to impress even a computer science graduate. But what does it do?

You can imagine having to face this and similar code in the middle of the night when the program has bombed, the manager is looking over your shoulders and the payroll has to be run by morning.

Where did all this obscene code come from? And, more important, where can we turn for a solution?

Unfortunately, most authors and consultants in the field of software engineering don't have the solution. Here are three typical examples:

Glass & Noiseux, in their book *Software Maintenance Guidebook*, state, "If you are reading this section to get an answer to the question, 'How can I reduce my maintenance costs?' and the question is about an already mature system, you may be asking the question too late. The nurturing and upbringing of the system

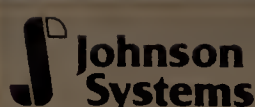
CICS

Johnson Systems software takes charge of CICS

- Track all transaction and program activity for detailed analysis and tuning.
- Create a history of CICS activity for long-term trend analysis.
- Track system availability.
- Highlight your peak resource usage with UMAX Graphic Command Language.
- Plot critical resource usage over a day, week or month, or over any time interval you define.
- Alter the format and content of the graphs included in UMAX extensive graphics facility.
- Reduce the number of records needed to report on performance and distribute costs through the Interval Logging Feature.
- Allocate resource costs by task, terminal, and/or operator identification fields and equate them with user accounting information.
- Answer specific questions with UMAX Exception Reporting Facility.
- Together with GOLD, get on-line answers to CICS performance problems, including response time.
- Join the 2,000 Data Centers worldwide who use UMAX for performance measurement, capacity planning and chargeback.

To take charge of CICS with UMAX, telephone today **1-800-368-1010** or 703-821-1700 or write for information.

Johnson Systems software helps run your data center as a business



8300 Greensboro Drive, Suite 700, McLean, VA. 22102 1-800-368-1010 or (703) 821-1700
Chicago (312) 655-3490 San Francisco (415) 348-5886 Dallas (214) 247-3252

Japan 03-437-0921 • Australia 411-5161 • Brazil (021) 294-9292 • England 923-46255 • Finland 0-890-188 • France 270 4444 • Germany (211) 320995 • Argentina 311-2019
Hong Kong 260450 • Indonesia 511809 • Italy (010) 411548 • Puerto Rico (809) 767-0845 • South Africa 787-5600 • Sweden 08/616500 • Venezuela 573-0611 • Mexico 548-4570



NEW LIFE FOR 1401 PROGRAMS

CS-TRAN converts your 1401 *object* programs to COBOL for the main-frame or mini of your choice.

CS-TRAN is the *only* translator that accepts your object programs, patches and all, yet allows you to include actual COBOL paragraph names and record definitions.

If you'd like more details about new life for your 1401 programs just call or write Russ Sandberg.



C-S Computer Systems Inc.
200 South Main Street, P.O. Box 356
Manville, NJ 08835 • 201-526-9000


```
IF AAA-PRJ-VALUE = TOT-PRJ-VALUE
  IF CC-PRJ-VALUE = SAVE-PRJ-VALUE
    IF AAA-NUM NOT = 'L'
      IF AAA-KEY = SAVE-KEY
        PERFORM 1266-SUM-TABLE
        PERFORM 1255-PRINT-RETRY
      ELSE
        IF AAA-KEY GREATER THAN SAVE-KEY
          MOVE TOT-AAA-WS TO TEMP-AAA-HOLD
          PERFORM 1255-PRINT-RETRY
          PERFORM 1266-SUM-TABLE
        ELSE
          IF AAA-KEY LESS THAN SAVE-KEY
            PERFORM 1255-PRINT-RETRY
            PERFORM 1266-SUM-TABLE
          ELSE
            NEXT SENTENCE
          ELSE
            PERFORM 1230-GET-TBL
            PERFORM 1135-AAA-SUM
        ELSE
          PERFORM 1260-SUM-IN
          PERFORM 1210-SETUP-FUND-ARRAY
        ELSE
          IF AAA-PRJ-VALUE GREATER THAN SUM-PRJ-VALUE
            IF SUM-PRJ-VALUE = SAVE-PRJ-VALUE
              MOVE SUM-AAA-WS TO TEMP-AAA-HOLD
              PERFORM 1255-PRINT-RETRY
              MOVE TEMP-AAA-HOLD TO SUM-AAA-WS
            ELSE
              PERFORM 1252-ERROR-RTN
            ELSE
              IF AAA-PRJ-VALUE = SAVE-PRJ-VALUE
                IF SUM-AAA-RPT-NUM NOT = 'K'
                  IF OUTPUT-ERR-SW NOT = '17'
                    PERFORM 1255-PRINT-RETRY
                    PERFORM 1266-SUM-TABLE
                    PERFORM 1135-AAA-SUM
                  ELSE
                    PERFORM 1252-ERROR-RTN
                    PERFORM 1266-SUM-TABLE
                    PERFORM 1255-PRINT-RETRY
                    PERFORM 1266-SUM-TABLE
                  ELSE
                    PERFORM 1230-GET-TBL
                    PERFORM 1135-AAA-SUM
                ELSE
                  PERFORM 1260-SUM-IN
                  MOVE '17' TO OUTPUT-ERR-SW.
```

Figure 1

have already determined its complexity, modifiability and, therefore, to a large extent its maintenance cost. Ask, instead, about your next software system."

Edward Yourdon has admitted, "If you're one of those unlucky managers who is stuck with the maintenance of 1,000 man-years of unstructured code, there is not much I can do for you, other than offer you a lot of sympathy . . ."

Another writer, having missed the real concepts of software engineering, advised his audience to "go back to using Cobol as it was originally conceived" [CW, June 27]. I sincerely hope that Jerry Sitner is not opposed to the inclusion of END IF, PERFORM USING, END PERFORM, inline and called subroutines (to name a few of the much-needed improvements) and the removal of ALTER, CORRESPONDING and many other aberrations of Cobol.

Cause for Hope?

The new light at the end of the maintenance tunnel is the promise of a programmerless society. The premise proclaimed by purveyors of the new DP snake oil goes something like this: If one could get rid of

Zip up your address files for ZIP + 4 savings



Introducing EZ-9 and EZ-5 from COM-MAIL. EZ-9 is a system that assigns the approved U.S. Postal Service ZIP + 4 code for extra discounts. It runs on any IBM/IBM-compatible mainframe computer or Univac 80/90 series computer. And for 5-digit ZIP codes, EZ-5 verifies, corrects or adds the current 5 digits to your files. Both products are easily installed, parameter driven. Use separately or as a complementary system.

Install EZ-9 and EZ-5 to:

- add more ZIP to your address files
- add more capability to your mail program
- add more bottom line savings

COMNET
COMPUTER NETWORK CORPORATION
Software Products Division, Dept. CW373
5185 MacArthur Boulevard
Washington, D.C. 20016

Call toll-free now at
(800) 368-5806
or locally at
(202) 537-7281.
Or unzip and mail this coupon today.

Yes! I want to ZIP up my address files.

☐ Send me more information.

☐ Call me to set up a presentation.

☐ Send information on other COM-MAIL products.

Name

Title

Address

City

State ZIP

Phone CW-393

Take the doubt out of buying personal business computers. Rent 'em and relax.



Worried about buying PCs blindly? Or doing without and losing precious productivity? Relax. Now there's a third choice. From a bulwark of the electronics industry: Leasametric.

Rent PC systems from Leasametric. Our rental packages feature the revolutionary LISA™ and the powerful Apple® IIe computer with 128K bytes of memory. Either machine comes with a choice of two printers. Software? We'll help select what's right for you: spread sheet analysis, word processing, file management, IEEE interface, and training software that's a snap to master.

We'll support you "around the business clock." Because your monthly rental fee includes a maintenance contract, simply call a toll-free number should something seem amiss. If it's a defect in hardware or software, we'll repair or replace it immediately. For more than 20 years of renting quality electronic equipment to technical professionals, we've kept our word.

Sound good? Give us a call. Leasametric offers a remarkable range of rental plans for industry. Call us and we'll give you these rental options—and a single monthly figure that fits your budget. There's more, including rental options on Texas Instruments' new Professional Computer. For all the facts, call **800-227-1817** today. And you'll be sitting pretty tomorrow.

Leasametric
1164 Triton Drive Foster City, CA 94404

IN DEPTH

Maintenance Problems	No. of Responses
1. No formal charter for the maintenance group.	10
2. Minimal standards for maintenance.	12
3. Poorly enforced standards for development.	14
4. Inadequate change request system.	9
5. Maintenance staffed by junior programmers.	11
6. Users not cooperative in checking test results.	9
7. Little protection of the maintenance group. (reaction to heavy pressure)	7
8. Unauthorized/unapproved changes.	5
9. Lack of maintenance history.	9
10. Programs maintained without any care for structure and documentation.	10
11. Absence of cross-reference of files/data to programs.	9
12. Absence of cross-reference of reports to programs.	11
13. Absence of cross-reference of tables to programs.	10
14. Lack of good test plan and test data bases.	12
15. Often-changing data values are hard-coded.	10
16. Logic for tables used in multiple programs is not centrally coded and reused.	9
17. Table values that change quite often are hard-coded.	11
18. Documentation not up to date to reflect the maintenance activity.	12
19. Poor/bad programmer-supplied names.	9
20. Tricky source code without any comments.	14
21. Deeply nested IFs that are difficult to comprehend.	11
22. Multiple-layered PERFORMs.	10

Figure 2

'The DP industry needs to take a fresh look at the resources it is allocating to maintenance. DP and user management must develop matching interests, back them up with commitment and use innovative methods to combat this long-neglected problem.'

all these programmers, one would not have all this bad code to maintain. Even if this end were possible, of course users cannot simply throw away the thousands of lines of existing poor code and start fresh. The problems still persist.

The new light at the end of the tunnel for many of these managers happens to be the headlight of the train coming at them.

By now it is obvious that the romantic promise of new technology is not the answer to the problem of existing software maintenance. As Timothy Cronin, president of Infoforex Corp., observed in an interview printed six years ago in *Dun's Review*, "There's more technology around now than can be used. We don't need more technology but rather a change in attitude so that it can be used better."

The DP industry needs to take a fresh look at the resources it is allocating to maintenance; DP and user management must develop matching interests, back them up with commitment and use innovative methods to combat this long-neglected problem.

During the mid-'70s, researchers began to warn us that software maintenance was beginning to consume disproportionate amounts of DP resources. For example, Barry W. Boehm stated, "Software maintenance is an extremely important but highly neglected activity . . . About 40% of the overall hardware-software dollar is going into software maintenance today, and this number is likely to grow to about 60% by 1985." Data processing publications, all through the '70s, were full of similar warnings of this imbalance between software development cost and

Honeywell and IBM terminal emulation at prices that will blow the socks off the competition.

We began by designing the best protocol converter on the market, favored for years by discriminating buyers, including several FORTUNE 500 companies. They like our quality. But they love our prices. As much as 60% below the competition. Line for line, we've got the best



Number of Lines/ System	Suggested List Price*
4	\$ 4,620.
8	\$ 5,620.
12	\$ 6,620.
16	\$ 8,620.
20	\$ 9,620.
24	\$10,620.
28	\$11,620.

*Plus a one-time software use license of \$500 per system. Call or write for complete price list and discount schedule.

product at the lowest price you'll find. Our MZ-80 is a real work-horse in a remarkably compact cabinet. And at the heart of it all, the 6 Mhz Z-80B™, the fastest, most powerful 8-bit cpu available. It will run bi-sync to your IBM-compatible host using ASCII CRT's to emulate 3270

terminals. Printers and other devices are also supported. For slightly more, we can handle most other popular host protocols, including Honeywell VIP. But that's not all. There's a whole range of other functions this little wonder can perform. Try it risk free for 30 days, and if you're not completely satisfied, we'll take it back.

Look for us at
HLSUA and NAHU.

TE

Thomas Engineering Company
1040 Oak Grove Road
Concord, CA 94518
(415) 680-8640



SDI introduced tape management to the DOS marketplace with EPAT in 1972 and now we proudly present the all new EPAT. Designed to help the person who stands between your input and output. Call us and we will tell you about the help command and also how to reclaim over one-half a megabyte of virtual storage, reduce paging, eliminate LTA usage, and achieve a marked thrupt increase over today's first generation systems.

For a free information kit describing EPAT, contact the SDI office nearest you:

- New Jersey
(201) 569-7212

Texas
(214) 241-8730
- Minnesota
(612) 835-6822

California
(415) 572-1200

IN DEPTH

subsequent maintenance. The question is: Were the DP managers, analysts and programmers paying any attention to these warnings? Recent research by Lientz and Swanson, reported in *Software Maintenance Management* (Addison-Wesley) showed that close to 50% of total man-hours

worked annually by application programming and systems analysis personnel were spent in software maintenance. If one adds to this the time management needs to supervise, technical support personnel time and the hardware resources used by the

maintenance staff, the total resources for maintenance easily approach 70% of the DP budget. This study corroborates research by Kapur & Associates, which found that close to 60% of DP resources were being devoted to software maintenance.

Conspiracy of Neglect

It is ironic to note that a typical data processing organization is staffed with a manager of programming and systems development, manager of technical support, manager of operations and, at times, even a manager of planning. But seldom does one encounter a manager of maintenance who has equal reporting level, clout and respect.

There seems to be a conspiracy of

neglect: If we don't acknowledge that maintenance exists, perhaps it will go away — the grand delusion. Dr. John King, University of California, stated in a 1980 article, "The nation's economic turbulence will probably increase DP work loads as well as the cost of system maintenance during the next few years ... possibly killing system development in centers operating under strictly enforced budget ceilings." King continued, "By clamping a lid on DP funding, the company would force its DPers to curtail development because the lion's share of that money would be needed for support of maintenance." In view of these dire predictions, one might hypothesize the following:

1. In terms of total hours worked annually by your programmers and analysts, what percent is spent on:

a. New development:

_____ %

b. Error correction:

_____ %

c. Additions/changes/deletions of functions:

_____ %

e. improvements:

_____ %

2. Does your organization have classifications for the following (or similar) position titles?

a. Manager of software maintenance:

How many? _____

b. Supervisor/project leader of software maintenance:

How many? _____

c. Maintenance analysts:

How many? _____

d. Maintenance programmers:

How many? _____

3. Does your organization have a well-defined maintenance charter with short-range and long-range objectives identified?

4. Are all maintenance requests (user- and DP-originated) logged in a central maintenance request log?

5. Does the maintenance group have a central help desk where the users can call to report problems and ask for clarifications and general help regarding their systems?

6. Are periodic meetings held between the maintenance staff, managers of major applications and users to review work accomplished, work pending and planned maintenance activities?

7. Are there procedures to identify and audit frequently maintained or poor quality reports?

8. Are users restricted from approaching maintenance staff directly to request maintenance to programs?

9. Are there procedures to ensure that program documentation (external and internal) is updated to reflect the maintenance effort?

10. Are there any programs in this system that have reached the 'untouchable' state (the maintenance staff is afraid to even touch the programs lest they fail completely)?

11. Does your organization currently have a well-defined maintenance reduction plan?

12. To what extent does your department currently face the following problems:

a. Unstable hardware environment.

b. Unstable system software.

c. Ongoing training unavailable.

d. Poor relationship between operations and programming staff.

Figure 3

ITEM NO.	EVALUATION ITEM	YES/NO N/A	EXTENT OF PROBLEM
1.	Is there an up-to-date program functional description?	_____	_____
2.	Is there an up-to-date maintenance history log formatted according to standards?	_____	_____
3.	Are all of the called programs described (functional descriptions)?	_____	_____
4.	Are any records processed in the File Section areas?	_____	_____
5.	Are data items in working storage grouped:		
	a. Functionally?	_____	_____
	b. Alphabetically?	_____	_____
	c. At random?	_____	_____
6.	Are redefined items clearly annotated to describe the reason/purpose of redefinitions?	_____	_____
7.	If a table is used in more than one program, is the table description copied into each program?	_____	_____
8.	Is there only one I/O routine for any given file?	_____	_____
9.	Are the nested IFs properly aligned, paired and kept within limits of readability and ease of maintenance?	_____	_____
10.	Are there any complicated and negative Boolean logic expressions?	_____	_____
11.	Has readability and maintainability been sacrificed for the sake of efficiency and in the name of 'structured' programming?	_____	_____
12.	Does the program contain any verbs (in any of the four divisions) marked for deletion from the Ansi compiler?	_____	_____

Figure 4

BRYCE'S LAWS ON INFORMATION SYSTEMS

"The complete specification for information is the relationship between data, systems and people."

This is one of the laws embodied in the "PRIDE"-Automated Systems Design Methodology. "PRIDE"-ASDM is an integrated and automated approach for engineering and manufacturing Information Systems. It is a straightforward business approach that is governed by the inherent principles of systems design & development. For more information on "PRIDE"-ASDM and a free poster on "Bryce's Laws", write:

M

B

A

m. bryce & associates, inc.

1248 Springfield Pike • Cincinnati, Ohio 45215

Tel: 513/761-8400

"Software For the Finest Computer-The Mind."

FOR THE

INFORMATION

CENTER

ADRS II* USERS

NOW THERE IS

"USING ADRS II"

INTRODUCING

AN INTERACTIVE COURSE (CAI)

SIMULATING THE FEATURES OF ADRS II

Yes, I'd like more information about your courses!

COMPANY

NAME

ADDRESS

TITLE

PHONE

CRWTH COMPUTER

COURSEWARES

613 Wilshire Blvd., Suite 200

Santa Monica, CA 90401 (213) 391-6788

Outside Calif (800) 282-2372

IN DEPTH

- 1. DP and user management are extremely concerned with this disproportionate rise in maintenance cost and are attempting to do all they can to stem the tide.
- 2. Because the majority of DP resources are committed to maintenance, effective tools, techniques, methodologies and education are easily available in the marketplace through vendors, universities and in-house.
- 3. Personnel assigned to maintenance

'There are practically no maintenance analyst and maintenance manager job classifications in the DP field — a fact totally contrary to other engineering fields.'

- nance are of the highest quality and enjoy substantial visibility, along with commensurate financial and professional rewards.
- 4. Due to the massive amount of existing software requiring maintenance

and improvement, companies have (or soon will) put in place rigorous software rehabilitation and improvement plans.

To the contrary. The sad facts are:

- 1. DP management, though concerned with the inordinate resources consumed by maintenance, devotes little effort to remedy the situation. Typically, its response is limited to moaning and groaning with occasional, short-lived stabs at correcting the problem.
- 2. Major portions of all the recently developed tools, techniques and methodologies are limited to the definition and development phases of system life cycles.
- 3. It is a common, though misguided, belief that the software engineering techniques are not applicable to software maintenance.
- 4. Very few DP organizations have seen fit to staff their maintenance departments with high-quality, senior-level programmers, analysts and project leaders. There are practically no maintenance analyst and maintenance manager job classifications in the DP field — a fact totally contrary to other engineering fields.
- 5. A survey of 32 DP managers revealed that only three had implemented rehabilitation plans ("Maintenance Reduction — In Search of a Unicorn," G.K. Kapur, Software Productivity Conference, Carmel, May 1982). When asked, "Do you believe your organization would benefit from such a plan?" 28 replied "yes," two responded "possibly" and two said, "Yes, but it would be hard to convince the users."

You don't need a computer to talk to another computer.



The new RCA APT (All Purpose Terminal) expands your data communications capabilities for a lot less money.

For business, professional and personal data communications, you'll find more user-friendly features and greater communications capabilities in the RCA APT than in other terminals selling for up to three times the price.

The new APT terminals are ideally suited to multi-data base time sharing and dedicated, direct computer-connected applications. They feature menu-controlled operation and a programmable "personality" to match specific communications requirements for your data bases.

A single keypress can dial a stored number, send the log-on sequence to the host computer, and return terminal control to the user. Password protection prevents unauthorized access to designated numbers. APT can also be used as an auto-dialer for voice communications.

OTHER FEATURES

RS232C port for direct computer connections at data rates to 9600 baud, or for connecting high speed modems and other accessories. Parallel printer port for hard copy. Numeric keypad, can dial phone numbers not in terminal directory. Built-in speaker with adjustable volume control for audio monitoring of phone line. Smooth scroll display. Automatic screen blanking to reduce possibility of burn. Briefcase size: 17" x 7" x 2". Weight: under 4 lbs.

Quite simply, matching features with price, there is no other professional quality terminal available today that can do as much at such low cost.

APT terminals list for \$399, in your choice of full stroke or membrane keyboard versions. Either style is also available with a display monitor for \$598 list. The data display monitor alone, VP3012D, \$229 list.

For more information—or to order—call 800-233-0094. In Penna., call collect to 717-393-0446. Or write for fully descriptive brochure to RCA MicroComputer Products, New Holland Avenue, Lancaster, PA 17604. OEM and dealer pricing available. The new RCA APT. Expansive. Not expensive.

APT VP3801. Flexible membrane keyboard version designed for travel and hostile environments.



Another question in the same survey was, "What percent of your organization's existing software needs to be rehabilitated?" The responses were:

No. of Responses	% Needing Rehabilitation
1	20%
3	40%
10	50%-60%
7	60%-70%
8	80%
3	All of it

We can safely summarize: Maintenance has been, and still is, treated as a necessary evil, often delegated to a group of trainees and junior programmers.

WOLFE-TEST YOUR EDP JOB CANDIDATES...
... In depth & job-related
"Competitive tests are merely multiple choice!"

Uniquely designed to evaluate:

APTITUDE:

- PROGRAMMERS
- ANALYSTS
- OPERATORS

KNOWLEDGE:

- COBOL • MVS
- DOS/VSE • IMS
- CICS • TSO/SPF

Call Toll Free or write:
WOLFE COMPUTER APTITUDE TESTING
Box 319, Oradell, N.J. 07649
1 800 431 1953 Ext 828
In N.Y. State
1 800 942 1935 Ext 828

In an effort to gain an insight into the specific causes for the high cost of maintenance, senior maintenance programmers from 14 DP organizations were asked to rank the problems contributing to high maintenance costs as shown in Figure 2 (on In Depth/16). Their responses are tallied in the column to the right.

Analysis of the responses raises important questions:

1. How many of these problems were present when the programs originally went into production?

2. How many of the problems result from work by maintenance programmers?

3. Do the original authors and maintainers contribute to these problems deliberately, due to carelessness, or because they don't know any better?

4. Are DP managers aware of these problems?

• If yes, why did they allow them to happen in the first place, and why do they allow the situation to continue?

• If no, are they really managing?

Similar research, corroborating our findings and conclusions, has also been conducted by Dr. Ned Chapin and was reported in the proceedings of the 1981 National Computer Conference.

Abdicating Responsibility

Should we conclude that DP management has abdicated its responsibility for effective management of software maintenance?

Many of today's managers and supervisors are, directly

or indirectly, responsible for the current state of software maintenance. It was under their supervision, and in many cases by their own work, that today's code was developed.

Having to come face to face with huge stacks of poor code can be a rude awakening, and to accept the responsibility for fixing it may be interpreted as accepting the blame for causing it. As a

result, the problem is often swept under the rug.

A quick review of problems 1 through 8 in Figure 2 shows that these are under the direct control and responsibility of DP manage-

ment. Then why haven't they been controlled? Discussions with a number of respondents to the problems listed in Figure 2 revealed some possible reasons:

1. Lack of direct supervi-

Getting your system in front of management is finally made simple.

Now your system can be accessed quickly and easily with Northern Telecom's Displayphone terminal. It's as simple to use as a telephone. And compact enough to fit on everyone's desk.

Perhaps the most difficult part of your job is getting your system in front of the people who would benefit from it most. Management often finds computer terminals too bulky or too complicated to operate. As a result they shut themselves off from information that can be vital to your company's productivity.

MIS professionals in a variety of industries have discovered the Displayphone* terminal, an ideal solution to the problem of user acceptance. Voice and data are integrated into one compact unit whose sophisticated capabilities are so easy to use, everyone will welcome it on their desks.

Menus of features and functions, visual prompts and terminal-resident soft keys guide even novice data users through correct operation easily. And soft keys can also be downloaded from your host computer for single key activation of program commands. As an advanced business telephone, the Displayphone unit brings the convenience of voice features such as directory dialing to data calls, and allows simultaneous voice and data communications.

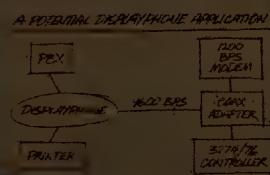
In addition to its ease of use, the Displayphone terminal offers powerful data access capability.

It is an asynchronous terminal that can also be configured to operate in IBM 3270 and other sophisticated computer environments. This flexibility gives users high speed access to a full range of corporate and public data bases.

The Displayphone terminal is an exciting example of Northern Telecom's commitment to the OPEN World—our approach to information management that combines telecommunications and computer technology in innovative ways to increase productivity, save time ... and money.

To find out how productive the Displayphone terminal can be for your company, call 800/621-6476. (In Illinois: 800/572-6724; in Canada: 800/268-9079), or send in the coupon.

OPEN World.
the rational approach to information management. It's the best of all possible worlds.



THE COMPLETE BRANCH OFFICE

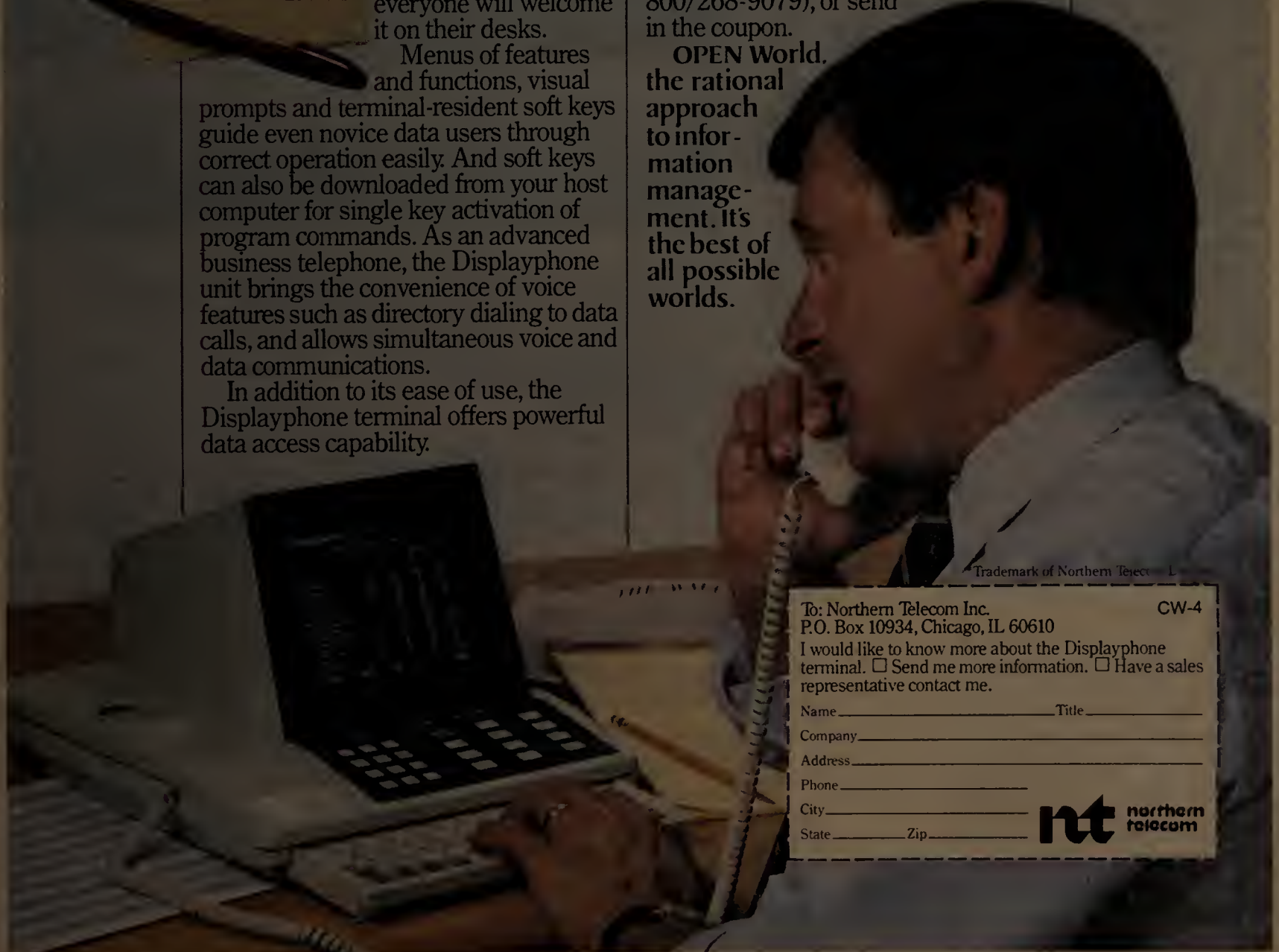
- | | |
|---|---|
| ☒ Luxuriously furnished | ☒ Prestigious address |
| ☒ Completely staffed | ☒ Short term agreement |
| ☒ Fully equipped | ☒ No capital investment |

All included when you lease from OmniOffices.

Atlanta (404) 256-0009	Houston (713) 965-0060
Chicago (312) 843-2500	New York (212) 867-5750
Dallas (214) 233-6664	San Francisco (415) 391-8810
Denver (303) 770-1000	Washington, D.C. (703) 821-8950

Or write for brochure:
S. Wilson, Leasing Manager
OmniOffices, Inc.
5775-E Peachtree Dunwoody Rd., NE
Atlanta, GA 30342

OMNIOFFICES



To: Northern Telecom Inc. CW-4
P.O. Box 10934, Chicago, IL 60610
I would like to know more about the Displayphone terminal. ☐ Send me more information. ☐ Have a sales representative contact me.

Name _____ Title _____
Company _____
Address _____
Phone _____
City _____
State _____ Zip _____

nt northern telecom

IN DEPTH

sion of program design, development and testing phases. How many first-line managers actually ever review the design and read the source code?

2. Lack of well-defined and adequately enforced standards, procedures and guidelines.

3. Mistaken belief that programmers will quit if asked to follow standards, procedures and guidelines.

4. Quick and dirty programming as an easy way out of slipped schedules.

5. The expectation by programmers that they will not be in their current positions by the time their programs go into the maintenance cycle.

It is a shame that persons applying for managerial positions are seldom, if ever, asked the question, "What percent of your current budget and resources are committed to maintenance, and by what percent did you reduce your organization's maintenance cost?"

Users Share Blame

Of course, not all the blame for high maintenance should fall on the shoulders of DP management. We know that users don't define their needs well, don't project far enough into the future, change their requirements even as the programs are being tested and often force unreasonable delivery schedules.

It is ironic that the people who eventually foot the bill for DP services are not fully cognizant of the maintenance problems, seldom inquire about their causes and almost never press for long-term solutions.

The same users who control the maintenance costs of their manufacturing plants, automobile fleets and heating and air-conditioning systems somehow completely ignore the cost of software maintenance. In fact, a stumbling block in the path of software rehabilitation is user apathy combined with a reluctance to support the cost of software rehabilitation. The often-heard response is, "We did not write this bad code in the first place, so why should we pay for its rehabilitation?" Although

these arguments may have substantial merit, DP management cannot undertake corrective actions unless supported by the user community.

It is obvious that there has

been much neglect both by DP management and users. However, an interesting question is: How many of the problems numbered nine through 22 in Figure 2 are actually the responsibility of

the original authors and maintenance programmers?

Course of Action

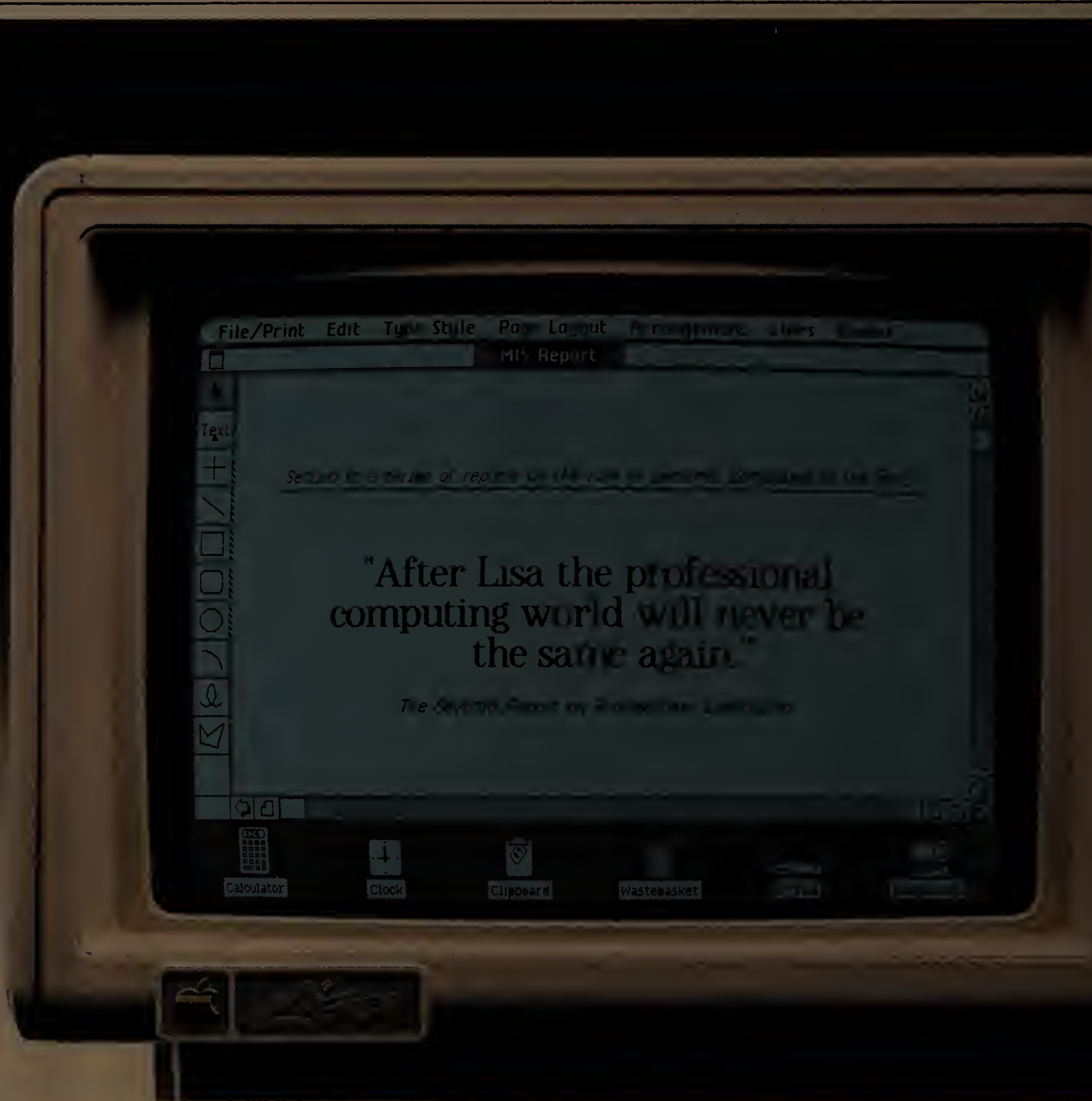
It is painfully clear that the industry needs a well-planned and effective meth-

od to attack the ever-growing problem of software maintenance. It simply is not practical to throw away the billions of lines of existing code and start fresh.

Over the past five years, a

number of DP organizations have reduced the cost of maintenance on their existing software through a maintenance reduction plan.

The plan can be defined as an organized set of proce-



Apple's new Lisa™ is the world's most powerful personal computer.

Its 32-bit MC68000 microprocessor gives it the processing capability of a mid-range mainframe.

It also has one million bytes of internal memory. And, with a 5-Megabyte hard disk, more than 15 times the on-line mass storage of standard microcomputers.

Given these most imposing credentials, one could get the impression Lisa was designed solely to scare one's socks off.

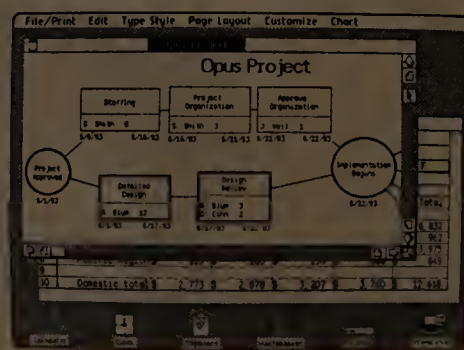
On the contrary.

What makes Lisa totally revolutionary is that, for the first time, all this phenomenal power is contained in a business computer you can learn to use in under 30 minutes.

200 years of hard work made it easy.

To tell Lisa what to do, all you have to do is point.

But achieving this simple concept required a totally new



Lisa's revolutionary software lets users perform several applications simultaneously, even "cut" and "paste" them together. The powerful project management program seen here is a Lisa exclusive.

approach to software and 200 person-years of development.

Lisa replaces complex computer commands with symbols

familiar to anyone who's ever worked at a desk.

Even someone who's never touched a computer before can learn Lisa in under half an hour. Versus the 20 hours or more required to unriddle conventional PCs.

To information managers, that means dramatically reduced training time and increased productivity.

But people don't just learn faster on Lisa, they also work faster. Each of Lisa's powerful applications* use symbols and commands common to all. So with little practice, users can move from LisaCalc to LisaGraph to LisaWrite without missing a beat. Or use them all at once, "cutting" information from one program and "pasting" it directly into another.

dures to upgrade and rehabilitate existing software in order to reduce the maintenance cost.

The plan consists of three phases:

Phase 1: Maintenance

management audit.

Phase 2: Software system audit.

Phase 3: Software rehabilitation.

The audit of maintenance management is conducted

through the use of a comprehensive questionnaire and a series of interviews designed to evaluate the true state of the maintenance effort.

The eight-part questionnaire contains material about

the following areas:

1. Maintenance logistics.
2. Maintenance organization.
3. Maintenance management.
4. Maintenance audit.

5. Maintenance procedures.

6. Major system audits.

7. Maintenance reduction plan.

8. Satisfaction level evaluation.

A partial list of questions from these eight areas is shown in Figure 3 on In Depth/17 (the entire list contains 101 questions).

Upon completion of the questionnaire and interviews, in-depth analysis and evaluations are used to develop a diagnostic study providing management with an assessment of the software maintenance function.

The second phase, a software system audit, consists of the following three steps:

1. A preliminary system audit: The objective is to develop an overall view of the existing system documentation and a judgmental view of the system from user and DP points of view. Key areas of focus are system architecture, expected life cycle, quality of data files and data bases, system maintainability, reliability and efficiency. A maintenance request log is also constructed.

2. Preliminary program audits: The objective is to gather high-level (functional) information on all of the programs in the system. The key areas of focus are a list of all programs, their functional narratives and high-level data flow (I/O) diagrams. Other key criteria are: Do they do their job, are they reliable and what does it cost to maintain them? Programs that have deteriorated to the "untouchable" state are also identified. All of the programs are assigned preliminary quality ranking values.

3. Detailed program audits: Programs are selected for detail audits taking into consideration their preliminary quality ranking value (from step 2 above), frequency of run, mean-time-to-failure and the size of the maintenance backlog. Four documents are used to conduct detailed program audits. The key document used to evaluate the programs is a checklist, selected questions from which are shown in Figure 4 (on In Depth/17). The "extent of problem" ranking of each item helps identify quality hot spots.

This checklist is also strongly recommended for use on every new program. It is important to note that the evaluations should be done and hot spots attended to

Powerful connections.

Any Lisa system can become part of a powerful Lisa network through AppleNet, our own low-cost local area network.

It will enable a user to transfer documents from one department to another, so they can be rapidly reviewed. Or modified. Or passed on to other Lisas.

The same network will allow Lisas to branch out to other Apples. Or share disks, printers and other costly peripherals.

Using the LisaTerminal program, Lisas can tie into mini, mainframe and other personal computers by emulating VT 100-type terminals. Or, using the Apple Cluster Controller, it can also emulate 3270-type terminals.

In short, one Lisa can do the chores of many terminals. All of which means swifter response times and better distribution of resources.

Stay on top of new developments.

Lisa's unique user interface enables programmers to develop Lisa-style programs with unaccustomed speed.

But that's not Lisa's only programming attraction.

The Lisa Workshop provides a powerful environment in which to develop COBOL applications. A full screen Lisa-like editor, code generator, and multiple windows make a

visible difference in development times.

Apple will supply all the documentation, instruction, and support a developer will require to integrate applications into the Lisa environment — no matter how sophisticated their information processing needs.

We support the whole family.

Apple now offers nationwide on-site service for all Apples in conjunction with RCA Service Company.

The hand operated mouse lets you use Lisa without touching the keyboard. All you have to do is point.

Plus a host of special services for Lisa — including a toll-free support line.

All of which you may never need.

A diagnostic program called LisaTest instantly isolates any defective board or component.

And the modular "plug-in" design of Lisa's five basic circuit boards and two disk drives allows parts to be replaced in seconds, with just one tool: Your fingers.

For the whole story, call our National Accounts Program at (800) 538-9696.

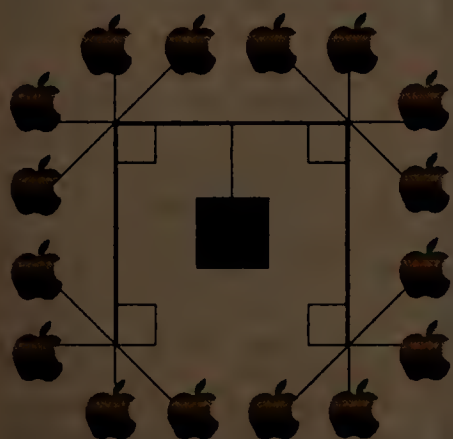
No matter how large your company, Apple has all the elements to improve your information systems management.

Including Lisa, the computer that makes headlines.



There's even a program — LisaProject — that lets you use the mouse to chart the progress of complex projects, automatically recalculating when deadlines or resources change.

On paper, Lisa is just as exceptional. With its dot matrix and daisy wheel printers, it produces printed materials just as you see them on the screen.



AppleNet, available soon, will let Lisas and other Apples share information, and costly peripherals.

*With more programs on the way, Lisa's library now includes LisaCalc electronic spreadsheet, LisaList data base, LisaWrite word processing, LisaGraph business graphics, LisaDraw presentation graphics, LisaProject electronic project management and LisaTerminal data communications. For information regarding corporate purchases through our National Account Program, call (800) 538-9696. In Canada, call (800) 268-7796 or (800) 268-7637. Or write to Apple Computer Inc., MIS/EDP Marketing Dept., 20525 Mariani Ave., Cupertino, CA 95014. ©1983 Apple Computer Inc.

IN DEPTH

before the program goes into the unit testing phase. This process will assure high-quality programs and help avert the maintenance problems so prevalent today.

The third phase, software

rehabilitation, consists of the following steps:

1. Individual program rehabilitation. This step encompasses facelifting (pretty print), restructuring, retrofitting, logic simplification,

documentation update, error correction and application of selected maintenance requests. Selected programs (with very low quality ranking) become candidates for rewrites.

2. Detailed system rehabilitation. The next step is to complete/update system-level documentation; draw up-to-date system flow or data flow diagrams; cross-reference programs to files and

reports to programs; catalog common file/record descriptions; list all tables with cross-reference to programs and similar system-level documentation essential for smoother system operation.

3. Program reaudits. Programs that had very low quality ranking before going through individual program rehabilitation are usually reaudited to ensure that their (post-rehabilitation) quality is now acceptable and that individual hot spots within the programs have been corrected.

A maintenance reduction plan such as the one summarized here can reduce the percentage of staff time spent on software maintenance from a high of 80% to a low of 30%.

Benefits DP organizations have experienced through the use of the maintenance reduction plan are:

1. High software reliability.
2. Considerable reduction in maintenance backlog.
3. Improved response time to change requests and error corrections.
4. Significant improvement in user satisfaction.
5. Improved productivity with more staff available for new development.
6. Higher morale among maintenance staff because they contribute to making systems more reliable and easy to maintain and to reducing maintenance costs.

The software maintenance function can be rehabilitated if the same engineering principles that are applied to restore/rehabilitate machinery, buildings and factories are applied to existing software. Data processing management must act quickly to develop a maintenance reduction plan and commit adequate resources, users must approve funds and the maintenance staff must restore the software to high quality.

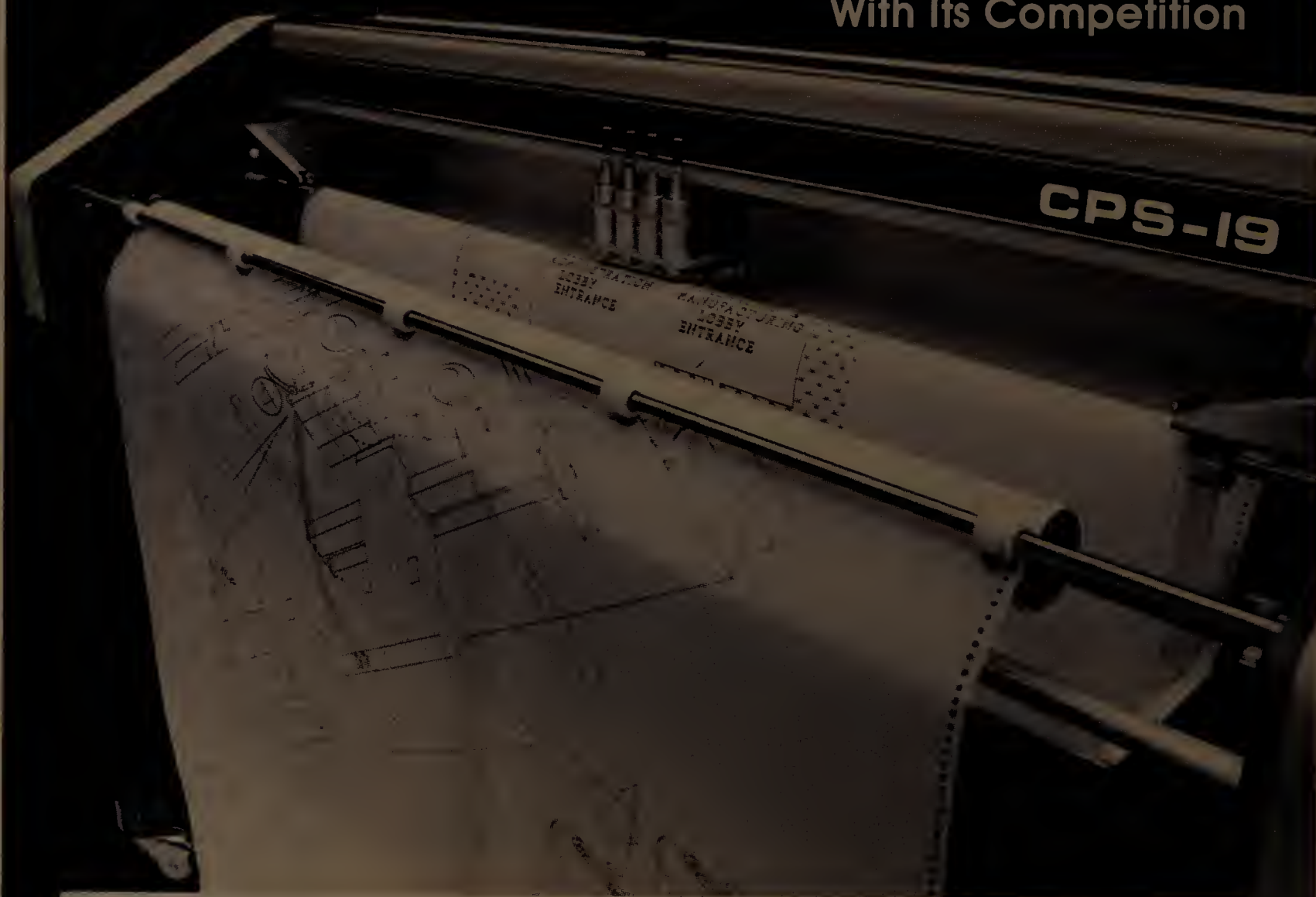
The same principles must also be embraced by the development staff to ensure that history does not repeat itself.

About the Author

Gopal Kapur is president of Kapur Associates, Inc., information systems consultants in Danville, Calif. His firm specializes in software rehabilitation and managerial effectiveness.

In May, Kapur received a distinguished achievement award from President Giani Zail Singh of India for his contributions to data processing education and management.

For Value Received Compare The Houston Instrument CPS-19 With Its Competition



We invite comparison on the basis of quality, reliability and performance... even though the comparison may seem unfair since the Houston Instrument CØMPLØT® costs much less than the competition. The competitive edge of the CPS-19 is based on solid design and meaningful capabilities. The end result is a highly cost effective 34.5" four-pen plotter that performs tirelessly and flawlessly on its owner's behalf. At its highly competitive price*, the Houston Instrument CPS-19 full-size plotter is thousands of dollars more affordable than others of comparable performance.

The CPS-19 will continue its thrifty ways far beyond the time of initial purchase. For instance, the CPS-19 will plot unattended, delivering drawings of up to E size, without interruption, on through the night and into the dawn. Since paper feed is continuous you can generate drawings at a time that's right for you or your system, rather than being restricted by an '8-to-5' plotter.

Finally, compare plot quality. The CPS-19 is an evolutionary stage beyond stepper-motor technology. Rugged servo drives incorporate both position and velocity feedback loops to tightly control pen and paper movement. The result is curves drawn with grace and precision, and straight lines of unerring accuracy.

For the name, address and phone number of your nearest representative, write Houston Instrument, 8500 Cameron Road, Austin, Texas 78753. Phone 512-835-0900, or 1-800-531-5205 if outside Texas. In Europe contact Bausch & Lomb Belgium NV., Rochesterlaan 6, 8240 Gistel, Belgium. Tel 059-27-74-45. Tlx 846-81399.

BAUSCH & LOMB 
houston instrument division

* U.S. Suggested Retail \$13,950

® Registered trademark of Houston Instrument.



A Hard Stand for Software Protection

**By David A. Savner
And Barry D. Weiss**

Software authors and producers rightfully want to know what legal protection is available for their programs and systems. The software industry's own effort to protect products from pirates slows growth and productivity while simultaneously forcing higher pricing.

In general, recent legal developments have made it easier to protect programs. Perhaps the most important news for software authors is the Aug. 30 decision by the Philadelphia Federal Appeals Court in the case of Apple Computer, Inc. against Franklin Computer Corp. [CW, Sept. 12]. This case solidified the view that computer programs are generally copyrightable.

Apple sued Franklin for copying copyrighted Apple II operating system programs. Some programs were in read-only memory (ROM), some were on disks and some were written in a manual. Some were in source code, others

in object code. The Federal Appeals Court agreed with Apple that Congress intended copyright to extend to all computer programs regardless of how or in what medium they are expressed.

By the terms of the Copyright Act, computer programs can be protected as "original works of authorship" when they are "fixed in a tangible medium." "Original" simply means not copied from another program. "Tangible medium" would seem to include writing in a manual, code on floppy disk or code in a ROM chip. A number of court cases dealt with whether the type of code language or the type of medium restricts the availability of copyright. The consensus favored Apple.

Earlier cases ruled that programmed ROM chips in video games were copyrightable. Such ROMs differ from Apple's in that video game ROMs directly generate human-readable displays, whereas Apple's operating system ROMs perform internal housekeeping chores.

Franklin's contention that this difference was crucial was not

persuasive. The Copyright Act specifically permits copyright of works that require the help of a machine to "express"; further, coded works have been held copyrightable by courts for decades.

The basic policy here is that the work need not be understandable or intelligible to everyone or anyone to be considered an original work of authorship.

Franklin said it had copied Apple's programs to achieve full compatibility with Apple and thus capitalize on the tremendous market in Apple-compatible peripherals and software. There was some evidence that outright copying was not Franklin's only solution. Moreover, Franklin's economic motives did not change the fact of illegal copying.

Franklin, though, has a pending countersuit charging that Apple has abused its copyrights in order to monopolize this market. The court has correctly ruled at this point that Franklin's anti-trust argument does not affect the validity of Apple's copyrights.

Copyrights and patents, of course, do grant limited monopolies to the producers of qualifying

IN DEPTH

creative work to encourage further discoveries, inventions and developments. Yet, as evidenced by Franklin's position, the standards for allowing such monopolies inherently produce some ten-

sion with the antimonopoly policies of antitrust law.

For purposes of copyright, the court refused to draw a distinction between source code and object code, between applications programs

and operating systems programs and between programs that were written and programs that were encoded on ROM chips. Franklin argued that programs on ROM chips are part of the electro-

mechanical processes of the computer. Processes are sometimes patentable but never copyrightable.

Apple, however, had not sought to copyright the ROM chips themselves, only the

programs "written" on the chips. Originally, the lower federal court expressed "some doubt" that programs in object code on ROMs could be copyrighted, but the appellate court made clear that they could be. With the primary issue thus settled, the case now goes back to the district court for further consideration of Apple's infringement claim and its request for an injunction restraining Franklin from using, copying, selling or otherwise infringing Apple's copyrights.

Intellectual Property Law

The question is how to secure "intellectual property law" rights — such as a copyright — in computer programs to deter would-be pirates. The difficulty has been in trying to fit computer technology into the existing legal framework.

Several legal devices lie under the umbrella designation of intellectual property law including patents, copyright, trade secrets and restrictive licensing agreements. Each of these, alone or in combination, may be useful for a particular software product.

For example, trade secret and restrictive licensing agreements are most useful where the software producers and end users are in direct contact by contract. The producer will typically require the purchaser to agree not to make unauthorized copies, nor to bootleg or divulge the programs.

In the case of trade secret agreements, the producer must take steps to maintain secrecy. If the purchaser violates the agreement, the producer can hold him liable in a lawsuit for breach of contract. Rights and remedies in this area are a matter of state law.

Trade secret and restrictive licensing agreements are less useful for widely distributed programs. Mass marketing means that secrecy becomes logistically harder to maintain; it becomes harder to control the customer's end use; and contract restrictions may actually make a program less attractive to potential consumer users.

In fact, some software vendors have found that licensing restrictions may cause more lost sales than prevent piracy. Texas Instruments, Inc., however, is currently experimenting with an innovative licensing



Using the GE 2120 teleprinter is understandably simple.

Easy to understand. Simple to use. This is the advantage General Electric has built into the reliable GE 2120 teleprinter.

Over a decade of electronic printing experience has led us to a special appreciation of human engineering...the science of designing machines with the user in mind.

That's why today's GE 2120 teleprinter is compact, lightweight, attractively styled, and most important, easy to use.

The keyboard is designed like a common typewriter keyboard. It's color coded and annotated for quick, easy set-up and format changes. All operations can be programmed and selected from the keyboard.

A conveniently located, easy to read digital LED display gives you printer parameters, print position, self-test diagnostic readouts and error messages...all in plain English.

There's also 150 cps print speed, high reliability under heavy workloads, options like a 32K text editor, and of course more. But take a close look at the GE 2120 teleprinter yourself. We're sure you'll find it's one man-made machine that's truly made for man.

General Electric. We introduced the first fully electronic printer with LSI circuitry in 1969. And our complete line today makes us the industry leader you should look to first.

First In Electronic Printing.

For the solution to your printing needs, call

TOLL FREE 1-800-GE PRINT

General Electric Company, Data Communication Products Department A311, Waynesboro, VA 22980. In Virginia, call 1-703-949-1170.

GENERAL  ELECTRIC

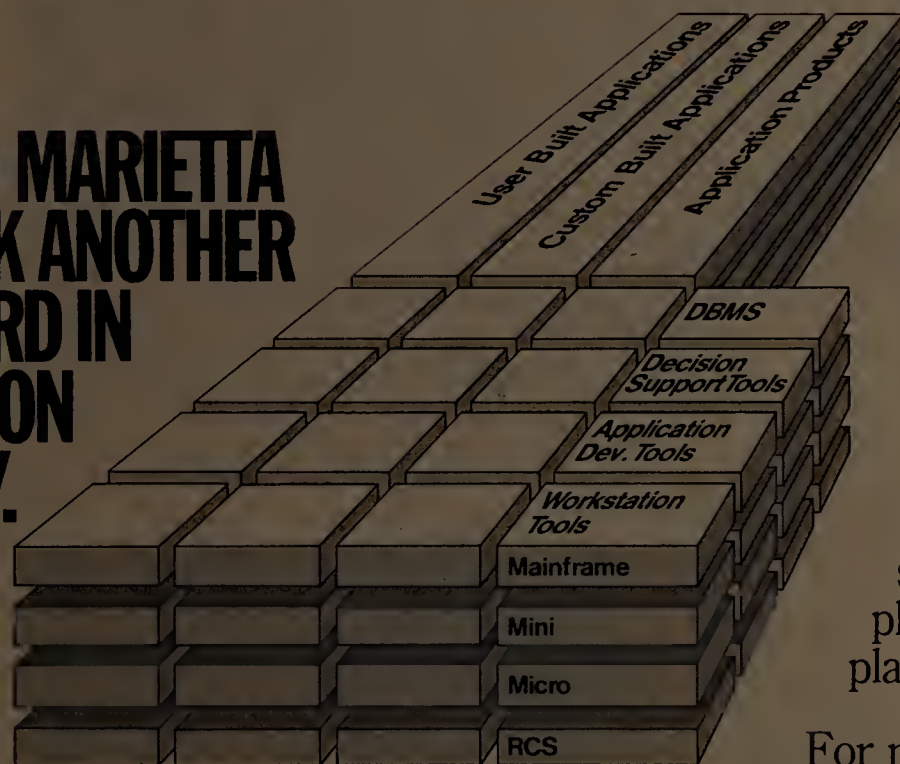
MARTIN MARIETTA DATA SYSTEMS BRINGS A TOTALLY NEW DIMENSION TO THE SOFTWARE MARKET.

ON JULY 22, MARTIN MARIETTA DATA SYSTEMS TOOK ANOTHER GIANT STEP FORWARD IN TODAY'S INFORMATION SERVICES INDUSTRY.

Martin Marietta Corporation and Mathematica, Inc., of Princeton, N.J., concluded a merger that brings together Martin Marietta Data Systems' decade of experience in information services with the industry's premier supplier of systems software products.

Now Martin Marietta Data Systems is positioned to offer customers a complete range of software solutions to meet their information management needs—whether they are buying standard applications, or building custom applications using systems software productivity tools.

Companies around the world now have a single source for all their software needs . . . *Martin Marietta Data Systems*. With RAMIS II, the leading fourth generation language and data base management system, we are now even better equipped to streamline software development time and costs, and to pass along these productivity improvements to customers—meeting



hardware requirements that range from mainframes to desk-top computers.

This partnership is a key building block in Martin Marietta Data Systems' strategic architecture for the '80s and beyond. We are not only living up to our commitment to stay on the forefront of today's explosive information services marketplace . . . *we are taking the lead.*

For more details, call us toll free at (800) 638-7080, in Maryland (800) 492-7170, or write Martin Marietta Data Systems, Marketing Services CW-A, 6303 Ivy Lane, Greenbelt, Maryland 20770. We'll send you a free brochure.

☐ Please send me a free brochure that describes Martin Marietta Data Systems' new software dimensions in more detail.

Name _____

Company _____ Title _____

Address _____

City _____ State _____ Zip _____

Mail to: Martin Marietta Data Systems
Marketing Services, CW-A
6303 Ivy Lane
Greenbelt, MD 20770

MARTIN MARIETTA

IN DEPTH

arrangement for its software packages.

On the other hand, patent and copyright protection are well suited for mass-marketed software. Recent court decisions such as Apple vs. Franklin have made clear that virtually all computer programs are copyrightable. Further, both the Patent Office and the patent appeals court have adopted a more liberal attitude toward granting patents on most computer programs.

'Copyright and patent are not mutually exclusive. For some computer systems, patent protection may dovetail with copyright — a patent will protect the idea and copyright will protect the expression of that idea.'

The difference between what may be patented and what may be copyrighted is rooted in the Constitution

and further delineated by federal statutes. Essentially, certain novel ideas, processes or methods may be

entitled to patent protection. The patent holder enjoys certain exclusive rights to the use of the patented idea, process or method. Copyright, on the other hand, secures certain exclusive rights in the author's particular expression of ideas, but not in the use of the underlying idea.

Copyright and patent are not mutually exclusive. For some computer systems, patent protection may dovetail with copyright — a patent will protect the idea and copyright will protect the expression of that idea.

Copyright Protection

Currently, a copyright is easier to obtain than a patent, and for this reason it has been recommended for all widely marketed computer programs. The advantages of copyright are many and the drawbacks few. The statutory and regulatory procedure for obtaining full copyright protection is relatively simple and straightforward. The basic requirements are notice of copyright and deposit and registration with the U.S. Copyright Office.

Copyright notice should be affixed to all forms of the program that might be perceived by human beings, that is, flowchart, source code, object code, ROM chip, floppy disk, package and any display generated onto a terminal. In addition, software documentation and instructions are generally copyrightable.

Once copyright is obtained, the copyright holder maintains exclusive rights to copy and prepare derivative works or translations. Copyright lasts for the author's life plus 50 years, or, if the program is a "work made for hire," for the shorter of 75 years from first publication or 100 years from creation. This period is obviously long enough to take full advantage of a program's profit potential.

A noticeable advantage of copyright for widely marketed software is that copyright will be enforced uniformly nationwide and to some extent internationally. Trade secret and licensing restrictions may receive different treatment from the courts of each locale. Remedies for copyright infringement may include money damages, attorneys' fees, court orders to seize and destroy illegal copies, court orders to prevent the making of further copies or even court orders to prevent the importation of illegal copies. Lawsuits to enforce trade secrets are usually harder to prove than copyright actions. Copyright infringement is proved by showing that the infringer had access to the protected work and that the infringing work is substantially similar to the original.

Copyright protection is not perfect, however. For one thing, it may be hard to detect isolated acts of infringement. Just as photocopiers and home sound and video recorders have facilitated unauthorized copying of books, magazines, music and films, inexpensive off-the-shelf

THE COMPUTER'S HEARTBEAT

The Universal 5¼" Diskettes.

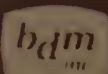
NEW - Pulse I - 48 TPI

Pulse II - 96 TPI Up to 1.0 MB.

NEW - Superior Magnetism for a LIFETIME.

NEW - Packaging - 2, 6, and 10 Packs.

FOR USE WITH ALL PC's



brown disc manufacturing, inc.

1015 Garden of the Gods Road Colorado Springs, Co 80907

(800) 654-4871 TELEX 450827

We're Driving the Drive Market.

copycat software now enables anyone to make illegal copies of programs. But authors of such works are not about to sue everyone who makes a copy.

Copyright alone does not completely protect software because it does not protect the underlying idea, process, method or algorithm, but only the particular expression written by the programmer. Thus, the distinction between ideas and their expression is legally important. If there are very few ways to express a particular idea, then an author could, in theory, copyright every permutation of program instructions which would express that idea and, without a patent, capture the use of the underlying idea. Copyright would be denied, however, in such a case. Most likely, one could not copyright a subroutine consisting of a few steps.

Only an expression of ideas may be copyrighted. But the idea or process itself is not copyrightable. For example, a novelist can copyright his novels, but he cannot copyright his ideas for the story line.

Depending on the type of software, the idea may be more valuable than the particular expression. When a software house spends a large amount of time and money researching and developing a method that it incorporates into a program, it would prefer to maintain exclusive rights to the method in order to recoup development costs fully and still make a profit.

Consider the expense to develop an integrated user-friendly package. Methods, as noted above, are not copyrightable. But this is where the recent patent law trend gives rise for optimism.

Patent Protection

A 1981 U.S. Supreme Court decision had suggested that only software systems that directly controlled machinery could be patented. Such a limitation would probably exclude most applications software. But the Patent Office recently granted a patent on a securities brokerage cash management software system. This action, coupled with liberal patent court rulings, indicates that patent protection could extend to most software systems. Nonetheless, the processing time for patent applications — typically three years — makes patents a rather impractical peg for most

software producers to hang their hat on, given the rapid pace of computer industry development.

Although some systems will qualify for both a copyright and a patent, it remains unclear whether copyright can be used effectively in conjunction with trade secret protection for custom installations and narrowly marketed systems. Copyright registration (which is a prerequisite to an infringement action) entails depositing some form of the program

with the Copyright Office, where it is then available for public inspection. Does copyright deposit preclude a programmer's claim of trade secrecy when the public has access to the program?

Under current regulations, the Copyright Office requires deposit of the source code format of software because it believes source code better represents authorship than object code. Registration can be had when only object code is deposited, howev-

er, the Copyright Office accepts such deposit under its "rule of doubt," which limits future infringement relief. Full public registration creates a legal presumption of copyright validity and is a prerequisite to recovery of statutory damages and attorney's fees. From the programmer's standpoint, depositing source code makes it somewhat more likely that a potential pirate searching copyright records would discern that the program was worth pirating.

For data access to your IBM mainframe, there's no place like home.



ANNOUNCING A PROTOCOL CONVERTER IN WHICH YOU'LL BE REMOTELY INTERESTED.

With the DataLynx/3274 protocol converter it doesn't matter where your personal computer or terminal is—a branch office in New Jersey, in the field, or even at home. IBM mainframe data access is only a telephone call away.

FEATURES TO WRITE HOME ABOUT.

The DataLynx/3274 permits the connection of async ASCII P.C.'s, CRT's and printers to an IBM host, thereby emulating IBM/3278 and 3287 devices. Using DataLynx's Standard Auxiliary printer support, up to 18

devices can be linked—one display station and its printer per dial-up or dedicated phone line.

MICRO TO MAINFRAME FILE TRANSFER.

Full file transfer capability (upload and download) by coupling FileLynx/3278™ with the DataLynx/3274 makes operators feel at home with file transfers to and from their IBM mainframes.

THE GREAT AMERICAN ACCESS STORY.

For remote dial-up or direct access to IBM host data, our FileLynx/3278™ program saves time and money. No more long delays obtaining data. Download data to your P.C. You'll have the latest information you need, when you need it.

USER FRIENDLINESS.

DataLynx puts you on the right path home by responding to a question mark command or giving you a default statement. We do our work, you do yours.

THE HARD FACTS.

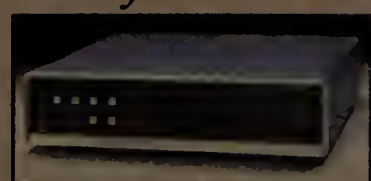
Paper/3278 provides hard copy to KSR terminals with the flexibility of the 3278 for on-line order entry as well as many other applications.

IT CAN KEEP A SECRET.

DataLynx is a state-of-the-art async-to-bisync or async-to-SNA protocol converter with dial-up features such as separate system password and reconnect password for session integrity, an inactivity timer and user-selectable forced log-off codes.

HOME IS WHERE THE DATALYNX IS.

Call today for more information about the remarkable capabilities of the DataLynx/3274 protocol converter. Then test one in your Data Processing Department. You'll find the DataLynx makes itself right at home. **Your Lynx to IBM.**



Local Data 
DATALYNX/3274

2701 Toledo Street • Suite 706
Torrance • California • 90503
Tel. (213) 320-7126 • TLX 182518

FOR SALE COMPUTER CENTER

112,000 sq. ft.
Los Angeles, CA

24,400 sq. ft. of office; UPS, MG Sets, Stand-By
Gen. Heliport; Security; Heliport; Cafeteria; 275
parking.

Adj. Major Hwy.

Excl. **HANNAH** Agt.
(213) 851-4335

IN DEPTH

Current regulations also permit deposit of only an "identifying portion" of the program. This situation limits public disclosure, but it might nevertheless destroy the secrecy of a trade secret, thereby barring any action for wrongful disclosure. Because the impact of deposit is uncertain, many attorneys today elect not to copyright software systems that are narrowly distributed under trade secret agreements. The Copyright Office recently stated that it is consider-

'Ultimately, we might expect to see some hybrid protection that is neither as easy to obtain as a copyright, nor as difficult to obtain as a patent. This hybrid will certainly not give the lengthy protection of copyright.'

ing drafting rules that would permit copyright-trade secret compatibility and invited public comment. Con-

gress is also considering the matter.. Computer technology has progressed more quickly than the law,

but the law is trying to catch up. The discussion above has focused primarily on the effort to adapt existing legal devices to the special problems faced by the software industry. There is also a significant effort under way in Congress to pass laws providing new kinds of protection for software and other computer products.

Because much software and "firmware," particularly programmed ROMs, seems to fall into the gray area along the dividing line between copyright and patent, a new hybrid device may provide the optimum alternative. Indeed, the dividing line between software and hardware is rapidly blurring. Bills proposing new types of protection have already been introduced in Congress. Ultimately, we might expect to see some hybrid protection that is neither as easy to obtain as a copyright, nor as difficult to obtain as a patent. This hybrid will certainly not give the lengthy protection of copyright. It will probably not last even as long as current patent protection. The life span to obsolescence is relatively short in the industry in any event.

After the 1978 report from the National Commission of New Technological Uses of Copyrighted Works (Contu), Congress passed amendments to the Copyright Act in 1980, expanding copyright to software, but still leaving many important issues unsettled. The Apple case has made clear that all programs, including those on ROM, are copyrightable, but debate continues over whether the chips themselves are protectable.

Congress began hearings on the proposed Semiconduction Chip Protection Act of 1983 this past summer [CW, June 6]. The proposed act would provide 10-year copyright protection for semiconductor chip masks, but the copyright holder would be bound to grant license to the work for a reasonable royalty. The bill thus would protect the holder's investment in development without stifling the dynamism of the industry. And this is exactly the balance that must be struck.

Computers and computer software may become our most economically important commodities in the coming years. But as Microsoft, Inc. and Digital Research, Inc. pointed out as "friends of the court" for Apple against Franklin, there must be clear legal protection to ensure that innovators will earn a fair profit to fuel further research and development. The recent trend in the law supports a favorable prognosis in this regard.

About the Authors

David Savner is a principal in the law firm of Fohrman Lurie Sklar & Simon, Ltd. of Chicago. He specializes in corporate law with particular emphasis on the general representation of high-tech businesses, including computer software firms.

Barry Weiss is an associate with Fohrman Lurie Sklar & Simon.

Fault Tolerance at a Very Tolerable Price.

Before you spend hundreds of thousands of dollars on a fault tolerant computer, hold on! Because NoHALT introduces the NH-1000: a fault tolerant microcomputer at a price that'll send the competition back to their pocket calculators. Base price: \$25,000.

No More Down Time
The redundant architecture of the NH-1000 incorporates dual system control processors, dual disk drives and controllers, dual data busses, dual line cords and dual power supplies. All working in tandem continuously, so you'll never have to worry about your computer

being down during critical, real-time applications.

No Revenue Loss
The NH-1000's exhaustively duplicated architecture assures you that even in the most catastrophic failure, you won't lose business or profits because of computer down-time. You can lose a disk drive, system control processor, power supply or data bus and still remain on-line, with no data loss.

**NoHALT
COMPUTERS**

Totally Flexible

The NH-1000 would be an excellent distributed front end for your PC's, since it accommodates a multi-user environment and supports PC applications on your existing terminals.

Put it all together, and it's a tolerably great accomplishment for \$25,000.

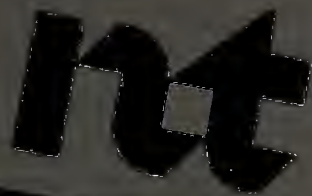
For more information and the name of your local NoHALT dealer, write or call:
NoHALT Computers
1750 New Highway
Farmingdale, NY 11735
(516) 420-9740

See us at INFO '83 Booth No. 1240

●● How in the world
can I plan my
data handling
when I'm not sure
what I'm going
to need? ●●



*That's what
we're here for.*



**northern
telecom**

Announcing increased data capabilities for our SL digital system.

When we first introduced our SL* digital business communications system, most of our customers used it for voice communications only. And it quickly became the most successful digital system in the world, with more than three million lines installed.

Today, we're building the same quality and reliability into data handling that made the SL digital system such a success in voice. We've made significant enhancements in both capacity and flexibility of the SL system data capabilities. With these increased capabilities, you won't have to worry about having enough data handling capacity. You can face the future knowing the SL system will be able to easily handle most data requirements you have.

Because of the way we design our systems, SL digital systems already in service can be quickly and economically upgraded to benefit from these new capabilities. And, of course, SL systems put into service today will be able to incorporate these and future developments.

You can be confident that the SL digital system will meet your communications needs—both voice and data—today. And it will be able to

accommodate what you need tomorrow.

The new data enhancements:

Our enhanced SL digital systems have the data handling capacity to give you full availability—a "network on demand." You'll have a clear data path. Through the use of advanced technology, we've also increased the processing power and improved the memory capabilities. At the same time, because of new double density line cards and triple density memory cards, we've been able to significantly reduce the size of the system. For example, the space required for peripheral equipment alone has been reduced by almost half.

To give you added flexibility and cost savings, we've increased our data line card capacity from two to four ports. Our **Four Port Data Line Card** is compatible with most current and planned data line interfaces.

●● We have all kinds of computers—
how can I get them to communicate
through the switch without a lot of
expensive hardware? ●●

Our new **Computer to PBX Interface** will allow many different makes and types of computers to communicate through the SL-1* digital system without modems or add-on data modules. This simplified interface means reduced cost of linking computer and PBX.

With our **Digital Trunk Interface**, you can cost-effectively set up a nationwide digital network. It allows transmissions of digital data between any SL digital system and digital central office switches without having to go through analog modems. This means there is no degradation; the quality of your data is maintained.

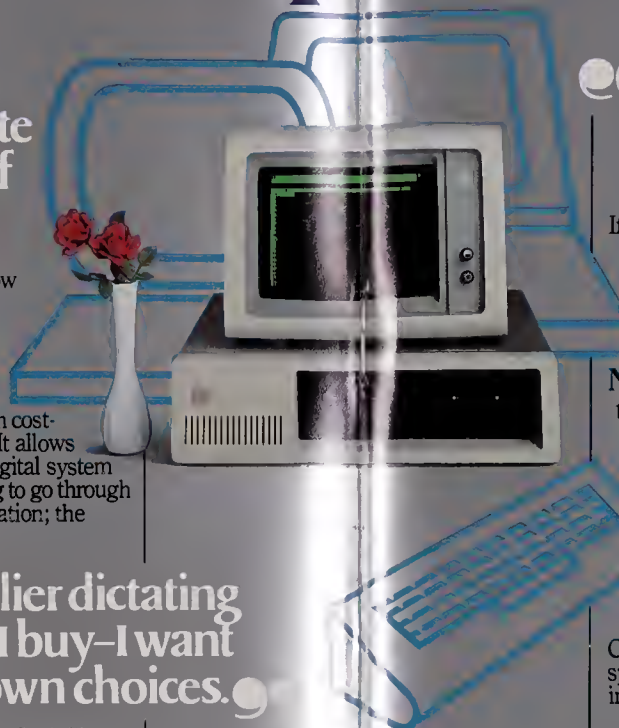
●● I don't want some supplier dictating
what kind of terminals I buy—I want
to be free to make my own choices. ●●

With **IBM 3270 Emulation**, you have complete flexibility. The SL-1 digital system acts as a protocol converter allowing most types of ASCII terminals (including our Displayphone* terminal) to access IBM host computers. It also allows a single terminal to interface with a variety of hosts. It turns a low cost terminal into a multi-purpose one, saving you considerable cost, as well as giving you more control over your system.

Our new **IBM 3278 Switching** gives you increased flexibility in how you use your resources. It enables a single terminal to access multiple hosts in a cost-effective way.

CP/M* is a registered Trademark of Digital Research, Inc.

*Trademark of Northern Telecom Limited



●● Personal computers are popping up
all over the office. How can
I keep the upper hand? ●●

If those personal computers are IBM's, you can easily and cost-effectively solve the problem. Our **IBM PC Interface Card** connects them directly to the SL-1 digital system with data communications speeds up to 9600 bps. The user can access your local and remote corporate data bases, and you can keep control over your information management system.

Northern Telecom offers even more solutions to your information management problems.

Another solution to the problem of proliferating PC's is Northern Telecom's own family of information processing products. We're adding a **Personal Computing Option** to our 585 and 565 office information systems. Using CP/M* and our 4.1 Omnitask* operating system software, the users can have the personal computing applications they want within the distributed information processing environment.

Our powerful 503 desktop computer, which also runs on CP/M*, is gaining even more power: a large capacity high speed 10 MB Hard Disk. This Winchester disk technology increases throughput and functionality.

●● Everyone's always wasting time
with telephone tag. It would sure
be great if I could put an end to it. ●●

The SL-1 digital system with **Integrated Voice Messaging** can. Internal and outside calls are automatically answered and messages recorded for retrieval at a convenient time. This new SL-1 digital system enhancement gives you an open voice messaging system that can quickly and easily put an end to lost messages and unanswered calls—and increase your organization's productivity.

Introducing a way to increase your data network's reliability.

With our new data **Network Management System**, we can help you control your data communications network. It interfaces with our and other suppliers' data communications systems to minimize downtime and maximize your network's efficiency. Among its many benefits, it reduces labor costs by allowing a central site to monitor unmanned remote sites and it gives you traffic and performance reports which help you anticipate and plan for future growth.

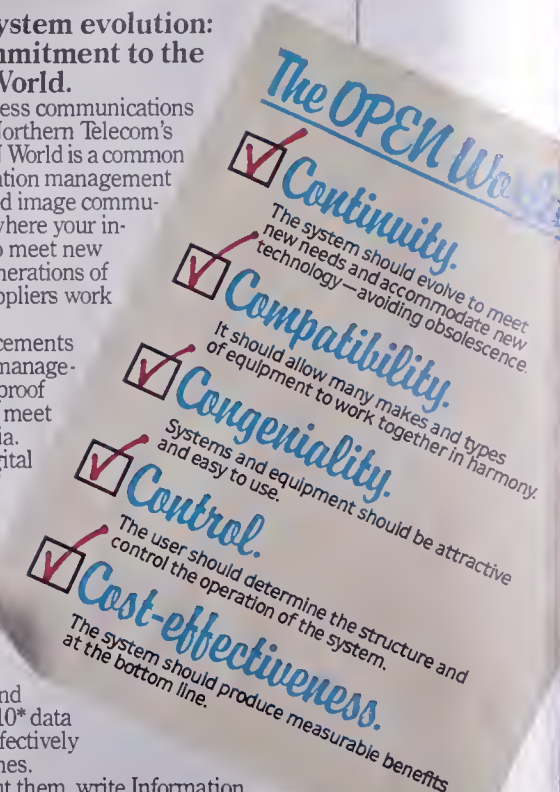
The SL digital system evolution: proof of our commitment to the OPEN World.

The SL digital business communications system is at the heart of Northern Telecom's OPEN World.* The OPEN World is a common sense approach to information management where voice, data, text, and image communications are integrated; where your information system grows to meet new needs; where different generations of equipment from many suppliers work together compatibly.

Our new data enhancements and our new information management features are further proof of this commitment. They meet all the OPEN World criteria. And they make the SL digital system the effective "hub" or controller of your information management system today—and tomorrow. You can plan your future with confidence.

Our SL digital business communications systems—the SL-1 and the SL-100*—and the SL-10* data networking system cost-effectively serve from 40 to 30,000 lines.

To find out more about them, write Information Management Systems, Northern Telecom Inc., P.O. Box 10934, Chicago, IL 60610; or call (800) 621-6476 (in Illinois (800) 572-6724).



It will meet your data needs now and in the future.

nt northern
telecom

●● Now I know
that tomorrow is
covered. Thanks to
the SL digital
system. ●●

*That's what
we're here for.*

nt

northern
telecom

SPECIAL REPORT

Weathering the Microcomputer Storm



Edited by Ed Scannell and Patricia Keefe

September 26, 1983

Supermicros Fill Mini, Desktop Micro Gap

By Robert V. Dickinson
Special to CW†

The traditional computer marketplace has developed in several stages, beginning with mainframes, followed by minicomputers and ultimately desktop microcomputers. Each step of this downward evolution has been characterized by decreased cost and increased user control.

But the traditional boundaries have dissolved as semiconductor technology has continued to provide more power for less money. The lower end is becoming even lower, with desktop (personal) computers becoming increasingly inexpensive and much more widely used. Likewise, minicomputers are encroaching on the high end — formerly the exclusive domain of the mainframes — by providing more and more power for the price.

A new kind of system — the supermicro — has emerged to fill the gap created by these diverging market categories. While the original minicomputer has increased speed and power with new 32-bit architectures, its price remains in the \$100,000 range. The supermicro typically sells for less than \$20,000.

Furthermore, the minicomputers and the new superminis have another key disadvantage: They almost universally use proprietary architectures and operating systems developed by a single manufacturer. This has served to keep users locked into that vendor's hardware in order to protect an often massive investment in software.

The new generation of supermicros, on the other hand, was designed with open and flexible architectures based on off-the-shelf, 16-bit microprocessors. They typically run an industry-standard operating sys-

'The traditional computer marketplace has developed in several stages, beginning with mainframes, followed by minicomputers and ultimately desktop microcomputers . . . But the traditional boundaries have dissolved as semiconductor technology has continued to provide more power for less money.'

tem (usually Unix) and feature large data bases and multiuser capability. Supermicro users obtain the power of traditional minicomputers at anywhere between one quarter and one half of the hardware price.

At the low end, desktop microcomputers are becoming more popular and, at the same time, causing major corporate headaches. The proliferation of micros in the office makes the absence of standards — in hardware, software and communications — glaringly obvious.

A desktop computer very effectively gives a user the local ability to process words and data; but it's nearly impossible to coordinate several users, each operating on a different brand of computer, who must work together and share information.

Yet one of the most important advantages of the supermicro derives from the evolution of the personal computer. When the 8-bit desktop computer became popular, so did an entirely new concept — mass-produced, portable software. Because supermicros also can run this vast library of software — and run it in a multiuser environment — they serve to lower total computer cost and increase the ease of computing.

And the supermicro can serve still

another role in the microcomputer area, that of shared-resource server. This role will be especially vital as emerging microcomputer networks become more viable and widely used.

Besides offering compatibility with the many new application packages developed for desktop systems, the supermicro has adapted itself to support existing minicomputer software as well. Supermicro vendors have been steadily porting minicomputer application languages to their machines, many of which run on Unix-based microcomputers.

Such a strategy serves to bridge the gap between proprietary and nonproprietary architectures and operating systems. The supermicro is an ideal solution for companies that want to migrate existing minicomputer software to less expensive

'While minicomputer vendors are emphasizing their superminis at the high end, they are also making a strong entry into the personal computer marketplace . . . Most of these systems, however, are single-user desktop computers not suited for the large data processing environment.'

hardware due to increasing demands from employees for local processing capability.

Data processing managers in corporate, multiuser environments can now extend computing capability to more users and protect substantial existing software investments without being locked into their original, costly minicomputers.

Unlike smaller desktop microcomputers, supermicros offer the power

and flexibility to run technical applications such as Fortran 77 and Pascal without sacrificing performance. In addition to these high-level languages, they offer a number of hardware options, such as floating-point processor boards for computation-intensive applications that traditionally were available only with higher priced minicomputers.

Other available tools allow the 16-bit supermicros to run both Unix and Digital Research, Inc.'s CP/M — the standard operating system of the 8-bit world — so that existing 8-bit applications can be transferred to Unix systems. Supermicro users gain the best of both worlds as Unix's high-speed computing power and multiuser capabilities are tied into the thousands of popular, inexpensive CP/M application programs already on the market.

Interestingly enough, while minicomputer vendors are emphasizing their superminis at the high end, they are also making a strong entry into the personal computer marketplace. Digital Equipment Corp.'s Rainbow and Data General Corp.'s desktop Generation computers are examples.

Most of these systems, however, are single-user desktop computers not suited for the large data processing environment that typifies these manufacturers' other products. As these firms are caught between maintaining compatibility with their older proprietary systems and addressing the newer de facto standards in the microcomputer world, they are leaving the middle ground open to supermicro vendors.

The real key to the success of supermicros is economics. A multiuser system, running lower cost, mass-produced software, yet capable of

(Continued on SR/4)

Inside

Mini Not in Danger
Of Being Eclipsed by Micro ..SR/3

Information Center:
Support for Micro Policy SR/4

Revenues Still Growing
For Mainframes, Micros SR/5

Sixteen-Bit Minis
Holding Their Own SR/7

Performance of Mainframe,
32-Bit Mini Merging SR/9

Supermicros Making It
As Multiuser Systems SR/11

Mini Vendors Must
Grasp Market Realities SR/21

Where to Turn When
Mini-Micro Mania Strikes ...SR/22

Supermini Shipments Up
31.9% Annually: Report SR/23

Desktop Unit Purchases
Need Careful Attention SR/25

Execs See Micro Option
As Fast Data Approach SR/26

Superminis Have Rosy
Future as 'Hybrid' Hosts ...SR/27

Micro or Mini?
Depends on Business Size ...SR/31

Does Your Company
Require a Minicomputer? ...SR/32

Despite Dire Predictions,
Mini Future is Bright SR/34

Maintenance Needs, Pact
For Service Shape DP Cost ..SR/35

Micros Seen Benefiting
Smaller Businesses Most SR/37

Mini Strikes Back
With Compact Packaging ...SR/39

Formulating a Policy
On Micros for Your Firm ...SR/41

Steel Works Turn With Help
Of Page Processing System ..SR/42

Users Win Independence
With Micro Revolution SR/48

Ability to Expand for Multiple Users

Mini Not in Danger of Being Eclipsed by Micro

By Carl W. Jack
Special to CW†

Just as the minicomputer has not replaced the mainframe, the microcomputer has not replaced the mini. Despite significant technological advancements that have made it possible for micros to support more than one user and much larger mass storage devices, it may be years before they can handle the highly complex operating systems and large number of terminals and workstations that minis presently support.

In fact, it is still more cost-effective in the long run to purchase a minicomputer to serve as a controller of several workstations or as a processor to front-end mainframe communications than it is to add on associate processors and mass storage devices to the average personal computer.

Consequently, the inherent limitations of the typical personal microcomputer will prevent it from ever taking the place of the minicomputer. Instead, minis will continue to serve as easily expandable resource management processors for multiple users and as cost-effective facilitators of communications with a mainframe.

Perhaps a brief definition of the terms "minicomputer" and "microcomputer" is in order before advancing the argument that minis are here to stay. Although there are no clear boundaries or universally accepted definitions to help distinguish a mini from a micro, a microcomputer or personal computer is usually thought of as a single, microprocessor-based desktop unit designed for a single user.

In contrast, a minicomputer, either comprised of information centers or a group of microprocessors, is generally considered to be a system designed specifically to support multiple users, high-capacity mass storage devices and communications with mainframes.

With these functional definitions in mind, the advantages minicomputers presently offer over the typical microcomputer are clear: faster processing speeds, greater expandability, ability to support large mass storage devices and a wide range of foreign devices and, most important, cost-effective communications with mainframes.

For example, few, if any, microcomputers on the market today can compete with the throughput of a 2 million instructions per second (Mips) minicomputer. The issue of CPU throughput is particularly important to those buyers looking for a system to support large numbers of users on a single computer.

Although add-on hardware and multitasking operating systems have been developed to support more than one user on a micro, adding more terminals to such systems only slows its response time to the point where it becomes too slow for most business environments.

Even those "minicomputers" being produced today using combina-

'Microcomputers today simply cannot offer the volume of resources that can be supported by a minicomputer . . . [and] are severely limited with regard to the number and range of foreign devices with which they can interface, such as printers, modems, terminals and communications devices not sold by the manufacturer . . . Minicomputers, on the other hand, can support just about any printer, terminal or other peripheral device made.'

tions of microprocessors — such as Motorola, Inc.'s 68000 or Intel Corp.'s 80186 or 8088 for the CPU with several support microprocessors to complete a single system — cannot match the speed of the older information center-based minis.

Admittedly, the rumored 32-bit microchips being developed by Hewlett-Packard Co. and Digital Equipment Corp. may soon deliver speeds up to 1 Mips. At this time, however, in the 16-bit arena, microcomputers do not match the CPU processing speeds offered by the average minicomputer.

Expansion capability is another

area in which minicomputers offer users much greater flexibility and investment security than microcomputers. The average desktop microcomputer costing approximately \$2,000 usually has enough on-board memory to support word processing, some general accounting packages and games, but, due to space limitations, it provides only limited expansion capability.

Now, almost without exception, most business users quickly find that their requirements exceed the physical expansion capabilities of their small micros, especially with regard to memory and the addition of a

large number of data storage devices.

In fact, it is not that uncommon to hear about a business that invests up to \$10,000 in enhancement products for its micro only to find that it must move to a replacement product or minicomputer once the business has pushed its micro to its limits.

Since minis are larger to begin with and designed with expansion in mind, they are the obvious choice for business users who are looking for a single piece of equipment that has significant memory and mass storage expansion capabilities.

In addition, microcomputers today simply cannot offer the volume of resources that can be supported by a minicomputer. Few, if any, microcomputers presently on the market have the ability to tie together several large 80M-byte to 300M-byte disks.

Also, most micros are severely limited with regard to the number and range of foreign devices with which they can interface, such as printers, modems, terminals and communications devices not sold by the manufacturer that built the system. Minicomputers, on the other hand, can support just about any printer, terminal or other peripheral device made.

Undoubtedly, micros in the future may have resource support and foreign device interface capabilities comparable to today's minicomputers. But for now, users with larger data storage requirements and the desire to select from the widest possible range of foreign devices cannot turn to a micro for a solution.

Without a doubt, minicomputers clearly have an edge over micros in the area of communications with a mainframe. For example, it will be a long time before a microcomputer-level machine will be able to do all of the things necessary to support a sophisticated architecture such as IBM's Systems Network Architecture (SNA) mainframe.

Many micros today, with the addition of integrated software/hardware communications packages, can talk to a mainframe via SNA, Synchronized Data Link Control, IBM 3270 or IBM 3780.

The problem, however, is that most of these packages operate on a one-on-one relationship with the mainframe and require the exclusive use of a line. As a result, micros inefficiently use the costly mainframe's resources when they require it to support communications with only one device per line.

In contrast, advanced minicomputer-based mainframe communications offerings can support many devices with only one line to the mainframe.

With greater processing capabilities and more power than micros, minicomputers can serve as efficient cluster controllers gathering and managing data transmitted to and from workstations and the mainframe over a single line.

Jack is vice-president and general manager of the Commercial Systems Division at Computer Automation, Inc.

Examining the Reasons
For the Trend Toward MicrosBy Ron Conway
Special to CW†

Some have argued recently that the microcomputer is making inroads into the minicomputer's market in the same fashion the mini impinged upon the mainframe's marketplace.

Advocates of this theory point to certain telltale signs as proof: Time-sharing OEMs are renting microcomputers to their customers in place of dumb terminals; traditional minicomputer manufacturers such as Digital Equipment Corp. and Data General Corp. are introducing micros; and, what is perhaps most telling, office system firms such as Lanier Business Products, Inc. and Savin Corp. have become microcomputer customers.

There are three reasons why there has been a trend away from larger systems and toward microcomputers: Micros offer lower costs coupled with greater power; they have standardization of both software and components; and they provide the ability to respond quickly to customer needs.

While minicomputers have grown substantially more powerful, they have done so only for a price. A machine offering five times the power of its predecessor may also have doubled in price from \$50,000 to \$100,000. Conversely, microcomputers have continued to provide more power for less cost.

Minicomputer vendors have walled themselves into an architectural prison. Proprietary processors and memories built with small chips resist change. A vendor looking to implement the forthcoming 256K-byte memory chips will be forced to go through a major retooling — developing new boards, changing the addressing schema and adjusting the system timing.

Microprocessors, on the other hand, utilize off-the-shelf components that drop in cost as they increase in volume production.

Sixteen-bit architecture from these chips, such as those made by Intel Corp., Zilog, Inc. and Motorola, Inc., have begun to provide performance comparable to the older, more costly minicomputer processors.

The minicomputer's link is not CPU speed, but I/O operations such as the speed at which information can be read from and written to the disk. As a result, typical business applications execute at about the same speed on a Digital Equipment Corp. VAX-11 or a Hewlett-Packard Co. HP 3000 minicomputer as on an Altos Computer Systems, Inc. 586 microcomputer.

Intel's newest chip, the 80186, is able to lower cost by replacing system components such as the clock generator, the interrupt controller and two direct memory ac-

(Continued on SR16)

Information Center: Support for Micro Policy

By F. William Guerin
Special to CW†

The most critical issue among several serious issues facing data processing managers is the need to bring order to personal computing within their organizations. DP can best achieve this objective by developing a structure that addresses issues raised by the corporate personal computer user in a way that is meaningful to the organization.

Creating the framework should begin with a study of current personal computer applications within the organization. Typically, end-user computing falls into two major cate-

gories: traditional and microcomputer applications.

Traditional uses include financial planning and data base management. Microcomputing applications include less complex forms of financial planning in the form of spreadsheets, as well as word processing, data base management and graphics.

After end-user computing has been analyzed, DP has completed the groundwork for developing a description of what services should be provided by the department. Chief among these services is in-house support of personal computing applications, usually in the form of an

information center.

The information center, a concept developed by IBM, is a subset of the DP department, whose charter is to provide end users with computing tools and access to the data necessary to solve their departments' business needs. According to IBM's L.W. Hammond, the fundamental goals of the information center are to provide proper education, technical support, usable tools, data availability and convenient access to the system so that users can satisfy their business requirements.

The service provided by the information center actually falls into

many distinct categories. For example, Ferrin Corp. recently developed an information center business plan for one of its clients, a San Francisco-based processed food concern.

The review indicated the client's information center should offer the following services, which are typical for most organizations Ferrin has researched: implementation and feasibility advice, product acquisition advice and assistance, installation assistance, end-user training (both in awareness and technology), managerial, product and program support and ad hoc consulting.

In most cases, establishing an information center requires approval from senior management. At this point, DP needs to be able to talk in management's language.

The request should be a formal business plan that defines the information center's function, as well as the roles and responsibilities of those who will staff it.

Not only will this document lay out exactly what the information center plans to accomplish, but it will also be a yardstick with which to measure the information center's success.

Most DP personnel do not hold Harvard University MBAs, but this is a place where it pays to think in senior management terms. Data processing should supply management with a structured business plan with cost justifications, cost/benefit analyses and the like — something that may be out of the scope of data processing.

After the information center has been justified, staffing will be a major concern. While DP typically has been concerned more with tools and applications for mainframes and minis, the end user is more con-

(Continued on SR/8)

Supermicros: An Alternative To Minis, Micros

(Continued from SR/2)

high-speed, specialized applications, is now affordable. This is evidenced not only by the fact that many existing large-system applications are being ported to supermicros, but, more importantly, by the fact that many new applications are being computerized for the first time.

The supermicro can also reduce the user's cost of tying into time-sharing networks by providing local processing capability. Users of Data Resources, Inc.'s Drilink systems, for example, can manipulate econometric information locally on a Zilog, Inc. System 8000 supermicro — at a cost lower than that of using a remote mainframe. And mainframe data is still accessible when needed.

Today's computer market offers the user more variety. For the traditional business, supermicros solve a great many multiuser needs.

Dickinson is vice-president and general manager of the Systems Division at Zilog in Campbell, Calif.

The 3270/ASCII Solution.

Term-Tronics' MEGA II—Access to Differing Computer Systems Without Sacrificing Your 3270 Capabilities

MEMO

Steve -
We need a terminal that can communicate with our IBM and non-IBM computers - what are our choices - I do NOT want to replace our IBM controllers and have to contend with protocol incompatibilities - look for a terminal we don't have to replace every 2 years because of changing protocols and communications needs - There must be an innovator out there - Boss

8-10

MEMO

Steve -
I knew you'd come thru for us - let's go with MEGA II - let me know how soon we can be on line. Boss

8-10

3270/ASCII OPTIONS

STANDARD ALL-IN-ONE TERMINAL?

Existing IBM C/U NO GOOD SCRAP!

Must have new C/U COST - \$16-50K

Only 16 B32 terminals can run on DEC. We need 28. Must install another C/U.

EST. TOTAL COST - \$19-53K (could go higher!)

MEGA II MULTI-FUNCTION WORKSTATION

IBM HOST DEC HOST

We keep our comp. all MEGA II's run on DEC and IBM

2 Direct access VT 100 terminals - No separate C/U needed.

MEGA II TERMINAL (Supports Models 2-5)

COST: \$2,500

TOTAL COST - \$2.51K

BOSS -
The MEGA II comes out way ahead... and it costs a lot less than our current system. Here are some other features we get -

- We can continue to use our existing COAX Cables.
- No need to "SCRAP" our IBM Control units... both IBM 3274's and 3276's work with MEGA II. No more protocol incompatibilities!
- The MEGA II allows us to remain current, even if we upgrade our DEC to the Prime system we discussed - we can dynamically change the MEGA II's personality to support the Prime, or almost any other computer we choose.
- We can still use all of IBM's new products, like the COAX multiplexers.
- Interestingly MEGA II supports all of IBM's 3278 Models 2 thru 5.
- The MEGA II even supports a personal computer option, with local print capability - Boss, I need one of these for my personal use!
- MEGA II can always dial up the DEC, even if the C/U is down - GOOD BACKUP feature
- This Terminal gives us an tremendous cost savings! Let's go with MEGA II!

Steve

Term-Tronics' MEGA II™ Terminal Display System is a cost effective technologically advanced multi-function workstation designed to provide users with maximum flexibility, productivity, and convenience. The MEGA II™ will never become obsolete when your computer is changed or upgraded.

MEGA II
The Truly Generic Terminal System

Regional Offices: Washington, D.C., New York, Chicago, Dallas, Houston, San Francisco, San Diego.

TTI
TERM-TRONICS, INC.

† IBM 3274, 3276, 3278, and DEC VT 100 are subject to trademark claims.

7408 Trade St., San Diego, CA 92121 (619) 271-1770

*Applications for Both Systems***Revenues Still Growing for Mainframes, Micros**

By Stephen S. McClure
Special to CW†

A popular theme of a few years ago held that the mainframe business was dying. More recently, with the explosive growth of micro-oriented desktop computers, this theme has shifted a bit so that now the minicomputer business is said to be dying. As Mark Twain might have commented, the reports of their deaths have been greatly exaggerated.

Mainframes, minicomputers and desktop computers all have applications — some traditional and some emerging. Revenues from all three categories are growing year by year.

Why the obituaries? The most plausible reason lies in the shift over time of the percentages of the total worldwide market revenues attributed to mainframes, minis and desktop computers. International Data Corp. (IDC) of Framingham, Mass., projects that the mix will shift from 54%, 30% and 16%, respectively, in 1982, to 30%, 33% and 37%, respectively, in 1988.

Clearly, mainframes and minis together "lose ground" to desktop computers. The same statistics, when viewed in absolute numbers, show growth in all three categories as the total market grows from \$33.8 billion in 1983 to \$86.8 billion in 1988. The average annual growth rate for each category is seen at 5.8%, 18.9% and 34.6%, respectively.

From this perspective, there is life in all three categories, with nothing dying. Markets simply grow at different rates.

Revolution Under Way?

Many people argue that there is a revolution taking place, namely that personal computers (also referred to as multifunction workstations or desktop/micros) are taking over the world. It is certainly true that continued technological advances in circuit and magnetic-recording technology have allowed desktop systems to attain characteristics associated with the mainframes of a decade ago.

IDC has predicted that later in this decade \$7,500 will buy a desktop system with capabilities such as:

- 1M byte to 16M bytes of main memory.
- 20M bytes to 200M bytes of secondary storage accessed as virtual storage under hardware control.
- .5 to 2 million instructions per second processing power (Mips).
- High-resolution bit-mapped color graphics with motion.
- Wideband communications interface capabilities.
- Optional voice I/O.
- Additional new I/O media options.
- Extended resource-sharing options with other systems.

At this level of capability and cost, the productivity gains derived by providing each member of an organization with his own personal computer easily justify the investment.

This is especially true for professionals who earn high salaries. This

new desktop resource will support applications not previously automated and will also displace some existing applications now running on minis and mainframes.

The same technological advances affecting desktop computers will be available to minicomputers and mainframes. As the capabilities of minicomputers grow, they will continue to invade traditional applications of enterprise-level mainframes, such as data base management.

Similarly, mainframes will grow to the new levels of capability re-

quired for emerging applications such as artificial intelligence and knowledge-based processing.

Enterprise-level and departmental-level applications were major targets for automation in the '60s and '70s. Individual-level applications will be automated during the '80s, and it is this vast, virtually untapped market which will account for the phenomenal growth of desktop computers.

The assimilation and integration within business enterprises of this proliferation of individual-oriented

information processing capability is certain to be a major challenge to, and an influence on, the total information processing market.

Investing in a personal computer can probably be justified with stand-alone applications. Soon after purchase, other opportunities for increased utilization will become apparent.

Major opportunities will be related to shared data and shared work within an organization (department, division and so forth) and extraction

(Continued on SR/7)

If Productivity Matters, So Does Service.

**When your
company
counts on
computers, you
can count on
TRW Customer
Service to keep
them up and
running.**

Downtime is lost time. If your systems or peripherals are not functioning, chances are that it shows in your business productivity.

Find out why more than 80,000 companies trust TRW to keep their hardware up and running with service when they need it. No hassles, no excuses. Just quality work at competitive prices from an organization dedicated to service, and only to service.

TRW Customer Service is the nation's largest independent repair, maintenance and service organization, with more than 3,000 highly trained, problem-solving professionals at over 200 U.S. locations — including Puerto Rico and Hawaii.

Computer Service. It shows on the Bottom Line.

Write for complete information and service locations.

TRW Customer Service
15 Law Drive
Fairfield, NJ 07006
(201) 575-7110

TRW

**Nationwide
Service From
A Company
Called TRW**

What's Behind the Trend Toward Micros?

(Continued from SR/3)
cess channels, all of whose functions were formerly handled externally.

Disk drive technology has also helped launch microcomputers into the business arena. Indeed, the small Winchester disk has removed the minicomputer's remaining advantage — the availability of inexpensive off-line storage.

The Winchester has benefited from denser tracking, a more economical design for head-positioning and from smaller packaging costs, shrinking from 14 inches to 8 inches to 5¼ inches. The drop per megabyte has been continuous — over

\$500,000 a decade ago to less than \$100 today.

Another advantage of the microcomputer's nonproprietary approach is portability. Unlike minis, each of which has its own operating system, microcomputers have generally stuck with a few standards: Unix (and microcomputer implementations such as Microsoft, Inc.'s Xenix), Digital Research, Inc.'s CP/M, and Microsoft's MS-DOS.

As a result, the microcomputer installation is not locked into software written for a particular manufacturer's hardware, nor is it confined to a single vendor. If a company is run-

ning Wang Laboratories, Inc.'s word processor, it must do so solely on Wang equipment.

Moreover, if it wants to expand into accounting packages, the field is limited to software written expressly for that vendor's hardware.

By contrast, the handful of microcomputer operating systems has created an open door on software development for both general packages and packages for vertical markets.

The same standardization carries through to custom-written applications. Although many programming languages do have a standard at their foundation (Ansi 74 Cobol, for exam-

ple), minicomputer manufacturers have tended to add proprietary enhancements, thereby defeating portability.

In the case of microcomputers, this is much less prevalent. Ryan-McFarland, Inc., for example, has written a compiler for its RM/Cobol that lets it run on virtually any major microcomputer on the market. This saves an installation from having to rewrite all its applications so they can remain compatible with a hardware change.

Over the long run, it now appears that Unix-like operating systems will prevail for multiuser and networking microcomputers. Unix provides software developers with a rich selection of tools, which is a key to creating a large base of applications.

With the increasing availability of commercial compilers, business packages are now emerging in great numbers.

A stumbling block in the path of microcomputer manufacturers has been the origin of their technology. Microcomputers were originally a tool hobbyists bought simply to learn more about them.

This perception of micros as toys still lingers, unfortunately, and the realization has been slow in coming that this technology is capable of providing complete information processing systems.

Local-area networks, for example, allow an installation to expand in much more economical increments than a larger architecture could permit. If a mainframe fills to capacity, the cost of expansion runs into millions of dollars, but with a local-area network, the investment is only a fraction of that.

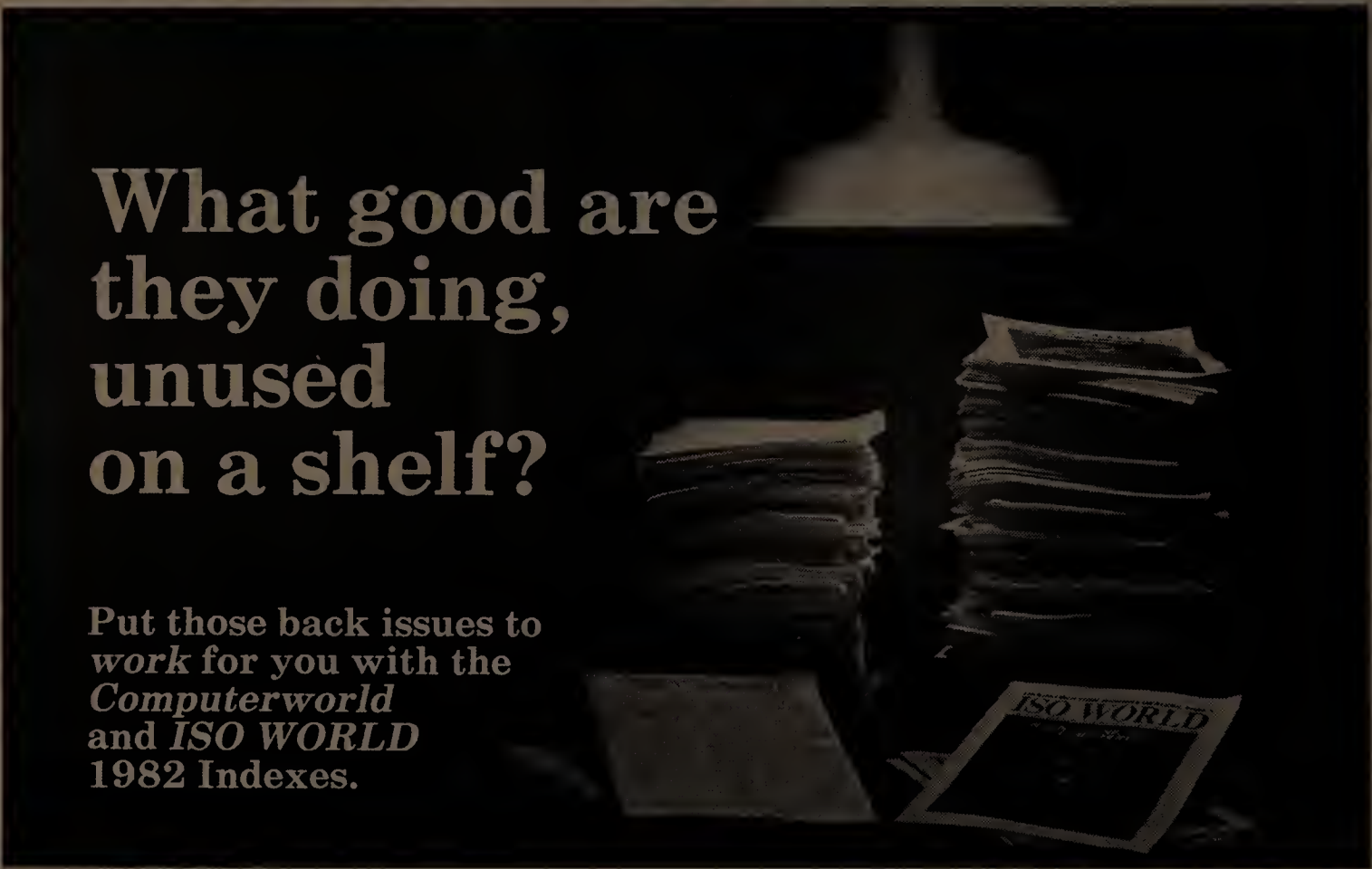
The cost of local-area networks are dropping, and they are becoming easier to use. Xerox Corp.'s Ethernet, which once required a proprietary networking circuit board selling for \$2,000 or more, is on the verge of having that technology replaced by a chip set costing around \$300.

Maintenance is another critical factor for business systems. National service may be offered in the form of third-party agreements.

With microcomputers, however, it is not always imperative that service be available within hours. When a minicomputer goes down, a company's business can be crippled. But because a single microcomputer carries only a small percentage of the load, a company can continue its operations. Rather than sign maintenance agreements at a steep cost, some minicomputer-based installations simply buy additional micros as spares to have on hand in case of failure.

Finally, there is the matter of delivery. Minicomputer vendors have traditionally been geared to selling to Fortune 1,000 companies, which have settled for a 90-day lead time. Microcomputer vendors differ by being reseller-oriented. As a result, microcomputer companies are better able to respond to sudden demands for their products.

Conway is vice-president for North American sales and marketing for Altos Computer Systems.



What good are they doing, unused on a shelf?

Put those back issues to work for you with the *Computerworld* and *ISO WORLD* 1982 Indexes.

You'll get great material for reports, back-up material for purchase decisions, resource material for contracts, research results for long and short-range planning — in other words — a terrific reference library at your fingertips when you use one of our Indexes to access all the information that's stored in your back issues of *Computerworld*, *ISO WORLD*, and *Computer Business News*.

With the *Computerworld* Index, you get an easy reference (including page numbers and issue dates) to all the information that's packed into all 58 (including *Extra!* and *Computerworld OA*) 1982 issues — 2,636 pages of news, stories, In-Depths, Special Reports, interviews, applications stories, features and tutorials on everything from AFIPS to Zenith.

And in the *ISO WORLD* Index, you'll find entries from 3 issues of *ISO WORLD* and from 36 issues of *Computer Business News* — 913 pages of industry news and trends, features, new product announcements, marketing and distribution articles, perspectives, columns, and analyses, on everything from AB Dick to Zentec.

Take a look at just a few of the hundreds of entries listed in the *Computerworld* and *ISO WORLD* Indexes:

Index	Heading	# Entries
CW	Local Area Nets	70
CW	Microcomputers	81
CW	Graphics Systems	136
CW	Accounting Systems	101
CW	Disk Equipment	126
ISO	Dealers/Distributors	64
ISO	IBM-PC	84
ISO	Floppy Disks	51
ISO	Modems	45
ISO	Retail Stores	53

And that's a sample of just this year. We also have Indexes for *Computerworld* that go all the way back to 1976 and Indexes for CBN back to the first — (Nov. 1978-Dec. 1979)

If you don't have all the back issues of *Computerworld* and *ISO WORLD* that you need to get the articles you want, you can order back copies for the entire year on 35mm microfilm from University Microfilm, Int., Periodical Entry Dept., 300 North Zeeb Road, Ann Arbor, MI 48106 — at very reasonable rates. Or you can simply take advantage of their reprint service for individual articles.

To get your Index, just fill out the coupon in this ad and send it with your check to Indexes/Marilyn Priante, Box 880, Framingham, MA 01701.

Year	Index	Price	Quantity	Total \$
1982	Computerworld	\$ 39.00	_____	_____
1981	Computerworld	\$ 35.00	_____	_____
1980	Computerworld	\$ 30.00	_____	_____
1979	Computerworld	\$ 25.00	_____	_____
1978	Computerworld	\$ 20.00	_____	_____
All Computerworld Indexes for last five years (1978-1982)		\$100.00	_____	_____
1982	ISO WORLD	\$ 39.00	_____	_____
1981-1978 CBN		\$ 60.00	_____	_____

Add \$1.25 shipping and handling for one book and 75¢ for each additional book. If your check is enclosed, we pay shipping costs. _____

Total cost _____

☐ Check enclosed ☐ MC (List four digits above your name)

☐ BA/Visa _____ Expiration Date

☐ American Express _____

If a charge, we need your signature _____

Name _____

Firm _____

Street _____

City _____ State _____ Zip _____

Sixteen-Bit Minicomputers Holding Their Own

By Aug Brown
Special to CW†

Despite the plummeting prices of 32-bit superminicomputers, both high-end and low-end 16-bit minicomputers continue to thrive in today's market. With the wealth of software written for 16-bit computers, there is no reason to move to a 32-bit machine when replicating most applications.

It is important to remember that users of an application are often unaware of the identity of the computer vendor, let alone the word width of the CPU.

Users with existing software investments in the 16-bit world have a strong desire to protect that software and will continue to use it without alteration.

Software Conversion Expensive

As studies have shown, software costs greatly exceed hardware costs over the life cycle of the application. In many cases, it is expensive and difficult to convert from 16-bit to 32-bit software. Sometimes this is also true for migrating within a vendor's product line.

Another consideration involves the cost of performance. If an application is performance-driven, and not memory-driven, then the 16-bit solution may provide more performance for the same amount of mon-

ey. Why is this true? If you take the same amount of silicon and organize it into 16-bit circuitry, it will perform better than the same amount of silicon organized into a 32-bit architecture.

In a 16-bit architecture, much of the circuitry can be devoted to processing speed and parallelism as opposed to managing the longer word width and larger instruction set of 32-bit machines.

With a strong demand for traditional and high-end 16-bit systems expected to continue over the next two to three years, the 16-bit market will remain viable. The hundreds of

thousands of 16-bit minis shipped by all manufacturers to date have been running thousands of applications without the need for 32-bit functionality. Where the code is written and stable and the software investment has been made, the sales of 16-bit minis will continue to flow.

What about the new software applications that have not been written? Now users must make allowances for their existing 16-bit or 32-bit environment in future software applications.

One must look at the issue of raw performance required in the application and determine if the problem

can be significantly enhanced by the large physical address space in a 32-bit world. The application's future direction should be evaluated.

If the price for either system is about the same, and if the 32-bit functionality does not benefit the application, then one 16-bit machine will generally give you more performance and equivalent application growth for a given investment.

However, many users are willing to pay a somewhat higher premium to install new applications in a 32-bit environment knowing that the cost of 32-bit hardware should continue
(Continued on SR/8)

Sales of Micros, Mainframes Still Growing

(Continued from SR/5)

and transmission of data from corporate data bases. It is the additional uses that will foster a good portion of the minicomputer and mainframe demand.

In a personal computing strategic analysis report, the Gartner Group uses the assumption that an additional Mips of central-site processing is consumed for every 60 microcomputers installed.

This additional capacity will be needed to support the processing and data base management requirements of the expanded base of users.

Similarly, using local-area networks to share major resources and to gain access via gateways to central sites and external data bases will increase demand for minicomputers acting as dedicated or multifunction servers.

The Gartner Group estimates that the original \$3,500 investment in a desktop computer will eventually result in a total cost to the customer of \$22,000 per personal computer.

This splits roughly to about \$7,000 for the original desktop computer and its add-ons, \$10,000 in minicomputers and \$5,000 at the mainframe level.

Clearly, major market opportunities do remain for minicomputer and mainframe vendors.

McClure is manager of advanced systems planning at Honeywell, Inc. in Billerica, Mass.

Hit The Jackpot of VAX* Resource Accounting & Chargeback Systems



'VMSACTSYS' The VMS* Accounting System From CIS ... The Application Architects

DEXPO* West 83 Booth #1029

*VAX and VMS are registered trademarks of Digital Equipment Corporation



165 Bay State Drive / Braintree, MA 02184
617 848-7515
Outside of Mass. Call Toll Free: 800-232 5215

Information Center Provides In-House Support

(Continued from SR/4)
cerned with business issues.

Information center staffing should reflect the need to address those issues. To ensure that happens, DP should develop profiles of initial staff and define the roles of the information center administrator and other staff members.

For future growth, a log of job descriptions, suitable background characteristics, profiles and possible candidates should be developed, along with recommended recruitment measures and resources.

Once staffing is under control, training will become the most important consideration. DP has long been concerned with mainframes and minicomputers; it must become equally well versed in microcomputers.

Classes exist that will teach DP about specific products, but that is not enough; the department needs sufficient information to be able to recommend a variety of product solutions to end users in the organization, as well as to train them to use the products. If DP has insufficient staff or is unfamiliar with microcomputer products, it may choose to rely on outside consultants for help in this area.

For example, Ferrin has developed a complete educational program with emphasis on training DP staff to support the end user. Training includes courses on how to teach end users and how to support both products and end users, as well as introductory and advanced courses on the products themselves.

Such issues as the personal computer world within large organizations and the evolution of the infor-

mation center are also a part of the program. Classes on how to support individual products are especially important. These should be more than just tutorials on a particular package and its uses.

Each class should address the advantages and disadvantages of each product, exactly what the product will and will not do and how it differs from other offerings.

With all the word processing packages available, for example, someone needs to define when one is more suitable than another. The information center staff should also be aware of what problems users are

likely to encounter with specific products, as well as how to overcome the problems.

As the micro-mainframe connection is made, this becomes even more critical. Data processing should be able to advise when financial planning should be done on the mainframe or when it is more appropriate to use a microcomputer spreadsheet.

A really thorough course will analyze the difference between spreadsheets and financial planning packages and will outline the features of the individual products within each category, as well as point out the strengths and weaknesses of each.

In addition to learning product information, DP needs to be educated in how to train corporate end users. Teaching is not something that comes naturally to most people; someone needs to train them in the fundamentals so that they, in turn, can train the end users.

All of this may seem like an enormous load for a DP department to handle. With the information center and the proper service organization to back it up, however, the DP department has at its disposal all the tools needed to take control of the microcomputers in the organization.

Guerin is president of Ferrin.

Are 16-Bit Minis Losing Ground To 32-Bit Units?

(Continued from SR/7)
to drop dramatically.

The low-end 16-bit market is exploding with the recent introduction of many new desktop computers. The price of these machines is so much lower than the price of 32-bit machines that this market should continue to expand for quite a while.

The new 16-bit systems continue to offer users better price/performance than their predecessors by allowing the same applications to run on lower priced hardware.

Lower priced packaging contributes greatly to the overall lower system price as technological improvements shrink both processor and peripheral design, allowing easier integration into desktop or workstation packaging.

Typically, these machines run the Digital Research, Inc. CP/M 86 and Microsoft, Inc. MS-DOS operating systems, allowing them to take advantage of a large variety of software already written.

Brown is a product manager for Data General Corp., located in Westboro, Mass.

Above all, Alfaskop System 41 meets *your* needs...with easy integration, complete flexibility, cost-effective expansion and thorough human engineering.

It all begins with local intelligence. Each Alfaskop system module—communication processor, flexible disk unit and terminal—has its own microprocessor. The Alfaskop communication processor, for example, can serve as many as 32 workstations simultaneously. And, each workstation can operate independently—performing different functions at different times.

Peripherals such as printers and flexible disk units can connect directly to the intelligent display unit, freeing the communication processor ports to support additional terminals. Data and programs can be stored locally. Alfaskop System 41 configurations can range from a single workstation to a multi-terminal system that interacts with a host computer and can also perform its own processing.

With any configuration, system integration is exceptionally easy. The same set of Alfaskop hardware is both compatible with and can interchange with most host systems. System 41 offers a choice of communications processors for remote and local interface. Synchronous (BSC and SNA/SDLC) and asynchronous protocols are standard. This

allows connection to IBM System 360/370/30XX or Series 4300.

That covers your system needs perfectly. But we meet human needs equally well. Extensive use of ergonomics means that Alfaskop adjusts to people and to the working environment.

A prime case in point is the

Alfaskop display unit. It's small and easily placed to provide a compact, uncluttered workstation. And it's designed to screen out potential problems.

For less than optimum lighting conditions, the display unit has an integral hood to shield the screen from harsh, direct light. To be easy on the eyes, we've also incorporated a non-reflecting screen with amber characters on a brown background.

Further, the operator literally tailors the system to meet his or her preferences. The screen can be turned, tilted or swiveled to suit any posture and operating style. The keyboard and its detachable numeric pad are freestanding from the display unit so they can be individually positioned and angled. And with built-in palm rest, the Alfaskop keyboard always provides proper wrist support.

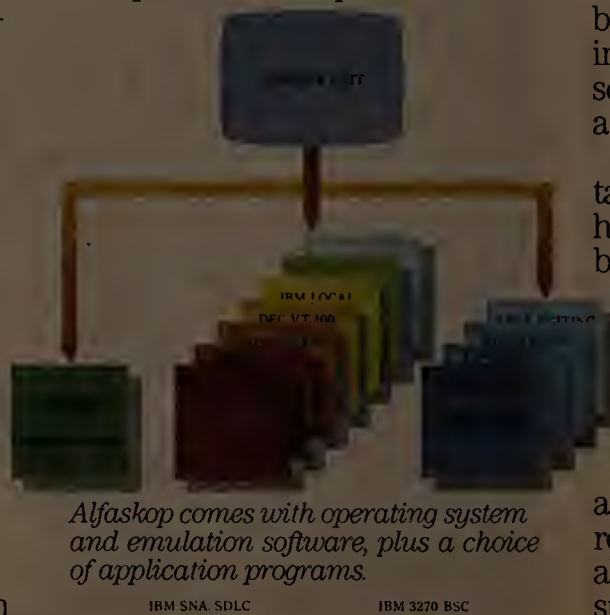
From both system and human

viewpoints, Alfaskop System 41 fits perfectly in the systems you design and integrate. For further details and application specifics, contact: Ericsson Information Systems, The Meadows Office Complex, 301 Route 17 North, Rutherford, NJ 07070. Telephone (201) 939-5300. Or Ericsson Information Systems

Marketing Operations, 7465 Lampson Avenue, P.O. Box 938, Garden Grove, CA 92642. Telephone (714) 895-3962.

ALFASKOP

IT MEETS SYSTEM NEEDS.



Alfaskop comes with operating system and emulation software, plus a choice of application programs.



With multi-host communication, mainframe selection is handled via keyboard commands.

Performance of Mainframe, 32-Bit Mini Merging

By Delmer Hunter
Special to CW†

As the performance of 32-bit mini-computers continues to rise, they are taking over many of the applications formerly given to mid-range mainframes. Indeed, their performance, price and architecture make superminis the systems of choice by a wide margin for many applications.

With this level of performance, the major issues today in deciding between a mainframe-style processor and a supermini are architecture, software availability and system compatibility.

The difference in architectures be-

'Mainframe IBM-style architecture was built to handle large applications in large chunks, with no interruptions other than those required for system functions . . . Minicomputer architecture, on the other hand, was built for exactly the opposite purpose — to handle interactive applications with nonpredictable real-time interruptions from more than one source.'

tween superminis and mainframes makes the 32-bit supermini far more suitable for today's on-line applications, as well as some of the medium CPU-intensive computing tasks in

areas like computer-aided engineering. The differences arise from the type of task each class of computer was designed to handle.

Mainframe IBM-style architecture

was built to handle large applications in large chunks, with no interruptions other than those required for system functions. There was one job stream with predictable I/O requirements and a relatively large, undivided memory space.

The architecture's goal, once all the parameters of an application were set up, was to perform that application as quickly as possible. As on-line, multiuser applications grew, system functions were added to the basic architecture for I/O handling, interrupt scheduling and memory partitioning, to name a few. For an on-line system, the user buys a mainframe plus an assortment of front-end gear.

Minicomputer architecture, on the other hand, was built for exactly the opposite purpose — to handle interactive applications with nonpredictable real-time interruptions from more than one source. This interactive history led to architecture that differed from mainframe architecture in three major ways.

The first difference is a larger CPU for the same size task — that is, if all other system elements are comparable, a supermini will possess more raw computing power. This is simply because an engineer must be somewhat like a utility company, supplying power the moment it is requested. This leads to built-in excess capacity and higher relative performance as the system becomes more complex.

Growing Applications

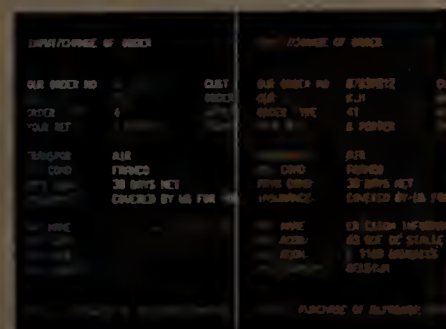
As minicomputer architecture grew into the 32-bit supermini, the size of the applications it could handle and the number of interrupts grew with it. The mainframe architecture devised in the '60s has less excess capacity because it was built for single-stream batch jobs, where demand for computing power is predictable. Sliced up to handle multiple users, it has grown very little in the past decade.

Second, a minicomputer operating system is structured to handle efficiently multiple users. Its scheduling algorithms are optimized for this environment, with efficient handling of multiple memory segments, minimal overhead in switching tasks and the ability to handle multiple tasks within a process and then to handle multiple processes. In contrast with these built-in functions is the com-

(Continued on SR/10)

SYSTEM 41

IT MEETS HUMAN NEEDS.



ERICSSON 
Ericsson Information Systems
For your information. It's Ericsson.

DESIGN, WRITING &
PREPARATION OF:
**USER MANUALS,
SYSTEMS/PROGRAMMING
MANUALS, OPERATIONS
GUIDES/RUN BOOKS,
AND OTHER RELATED
TRAINING MATERIALS
AND DOCUMENTATION**
SYSTEMS DOCUMENTATION, INC.
 222 Bridge Plaza South
Fort Lee, NJ 07024
(212) 724-5055 (201) 592-8745
"Shirtsleeves Productivity"

Minis Taking Over Mainframe Applications

(Continued from SR/9)

plex JCL required in an IBM-style application.

Third, the interrupt structure and I/O handling are built for multiple keyboard users. A mainframe architecture built for quickly reading a large number of records into memory is inefficient "chasing" characters from keyboards and must rely on channel adapters and I/O controllers, with their attendant buffers, to manage terminal devices.

These three areas have a major impact at the system software level where the supermini environment is simpler than the mainframe because less overhead is necessary to support interactive work, and fewer interdependencies exist between components.

This is not to say that supermini instruction sets are not as powerful or comprehensive. What it means is that superminis are far more "tweakable" than mainframes in the large integrated applications now being developed.

Next Best Thing

Because there is no way that a computer manufacturer can predict how many system resources each part of a specific application will take, it does the next best thing, which is to supply a series of tools that allows this tailoring to be quickly and easily done by the person who knows that application best.

A set of utilities and tools are available that permit a user to allocate system resources and set task priorities very specifically at whatever level the user wishes, from simple adjustments such as guaranteeing a certain percentage of CPU cycles to a process to relatively more complex adjustments such as deciding which branch in an instruction stream will flush the instruction pipeline.

Application software, a sticky point with early minis, is no longer an issue: Most major packages have been, or are being, ported onto the supermini.

Some superminis support every major language and provide data base, networking and communications software. These capabilities have encouraged the major software houses to convert their packages onto the supermini. These packages include integrated financial and manufacturing packages, vertical applications and many engineering and design packages.

The conversion problems from mainframe to super-

mini have been trivial for those packages written in high-level languages — as long as the supermini supports standard versions of the languages.

System compatibility, from desktop to mainframe, is rising in importance as end users, management information systems managers

and manufacturers gain experience with the new wave of computing power and understand how on-line systems will evolve.

The first on-line systems had two levels: dumb terminals on the desk and the mainframe at the central site. Today, the dumb terminal is often augmented by a per-

sonal computer, which often is not compatible with the mainframe.

In the future, as on-line information systems expand, the typical system will add a third, intermediate level between the desktop and the mainframe. The question then becomes: At which level does one put the interactiv-

vity?

The answer lies in the nature of information use. At the desk, a worker needs three functions:

- Access to public data bases.
- Support of his own activities for work that is not related to the corporate data

(Continued on SR/11)

CAN YOU FIND THE IBM* 3278 HIDDEN IN THIS PICTURE?



It's right there.

Inside the Advanced Personal Computer from NEC Information Systems.

In fact, the Advanced Personal Computer is the best personal computer for direct connect 3278 emulation, with 3274 and 3276 controllers.

Get the advantages of personal computing plus direct connect 3278 emulation.

With the APC, your people will be more productive than ever before.

They can easily perform all their existing 3278 applications. Then, with a single keystroke, switch to a full function personal computer, quickly

and easily.

And the APC is fully compatible with all 15 different 3278 keyboard configurations.

And it offers a full range of communications protocols, including SNA/SDLC, asynchronous and bisynchronous.



WITH A SINGLE KEY-STROKE, YOU CAN SWITCH FROM 3278 EMULATION TO A FULL FUNCTION PERSONAL COMPUTER.



A MAJOR INSURANCE COMPANY IS USING THE ADVANCED PERSONAL COMPUTER TO GREATLY INCREASE WORKER PRODUCTIVITY.

Supermicros Making It as Multiuser Systems

By David Van Den Berg
Special to CW†

A few years ago, a manager looking for a multiuser computer system had to consider an expensive minicomputer or an even larger system. At that time, the investment for a system supporting two or more users was substantial.

Today, the options are broader. Top-of-the-line microcomputers offer multiuser, multifunction capabilities that eventually may make the minicomputer market obsolete.

The two types of systems now offer similar performance and capabilities at dissimilar prices. Since the su-

permicrocomputer is new to the business market, thorough comparative information is hard to find.

This means that today's manager must sort through a bewildering number of arguments concerning system price, price per unit, distributed vs. centralized data bases, system degradation

and various fine points of system architecture in order to make his selection.

These arguments are overly complicated and often mask the real considerations. And the real considerations are simple.

A user needs an affordable system that will solve his immediate needs and expand to

meet future needs.

The following points will help the potential user understand the differences — advantages and disadvantages — of multiuser micro and minicomputers:

- **Initial acquisition price.** Probably the most important questions you'll need to address are: "How many people will eventually need to share information stored on the same system?"; and "Do you expect your business [and therefore your computing needs] to grow?" Whether you start with one user or several, it's the long-term need that will dictate the system capability and software you should buy.

Next, you need to decide how much capital you want to invest immediately. With
(Continued on SR/12)

Own for less than you pay in rent.

With all this functionality, you'd probably expect to pay a small fortune for the APC. Surprise! The APC can be purchased for less than 1 year's rental charges on a 3278.

Which means you can offer your people a lot more functionality and *still* pay less.

Software, software, and more software.

With the APC, you can choose from hundreds of different software applications programs.

You can get word processing, forecasting, spreadsheets, database management and much more. In fact, we probably have a software program for any need you might have.

3278

YOU CAN OWN AN
NEC ADVANCED PERSONAL
COMPUTER FOR LESS THAN THE
COST OF LEASING A 3278 FOR 1 YEAR.

The APC also offers you the best color graphics in the industry, and a wide range of graphics software. The most storage capacity of any computer in its class. And the kind of reliability that NEC is famous for.

All for less than you're paying now.

*IBM is a registered trademark of International Business Machines Corp.



WITH THE ADVANCED
PERSONAL COMPUTER,
DESKS ARE LESS
CLUTTERED AND
PEOPLE ARE MORE
PRODUCTIVE.

Find out more about NEC's Advanced Personal Computer.

For more information about the APC, or for the location of your nearest NEC representative, call 1-800-343-4419.

And find out why so many 3278 users are saying "NEC and me".



THERE ARE
HUNDREDS OF
PERSONAL COMPUTER
SOFTWARE PACKAGES THAT
RUN ON NEC'S ADVANCED
PERSONAL COMPUTER.

NEC AND ME

NEC Information Systems, Inc.
5 Militia Drive, Lexington, MA, 02173



Applications Expanding For Minis

(Continued from SR/10)
base.

- Support of his own activities for work that is related to the corporate data base.

The ability to shift a file transparently from desktop to mainframe, and vice versa, is critical in this environment. Today, it is difficult to interface any local intelligence to an IBM 4341, whereas system compatibility and networking software from some vendors make it a simple, transparent task.

At the intermediate level, the upward- and downward-compatible supermini becomes the super traffic manager, interfacing desktop systems with the mainframe system and providing computing power if it is required. This type of integrated application cannot be done efficiently without compatibility from desktop to mainframe.

There are other reasons why superminis are replacing mid-range mainframes in many applications. In the marketing area, mainframe companies generally extract a premium for expanded performance and memory; with the supermini, increased price/performance has generally cost incrementally less.

The supermini's virtual performance makes it more suitable than mid-range mainframes for all but the largest modeling programs.

Hunter is manager of large systems marketing for Data General Corp. in Westboro, Mass.

Choosing Between a Multiuser Micro, Mini

(Continued from SR/11)

a minicomputer system you need to buy a single computer that satisfies your future requirements. As you add users, you can add inexpensive terminals. That means you'll have a large up-front cost; adding users until you reach system capacity is relatively inexpensive.

The initial expense for a supermicrocomputer is much less. Instead of a single large investment, your system is built through a series of smaller purchases.

Therefore, if you eventually need a system to support many users but initially will have only two to four, the start-up cost for a minicom-

puter system will be very expensive compared with the new supermicrocomputer systems.

The multiuser microcomputer-based systems can be expanded indefinitely by networking or wiring the computers together, providing a broad range of capabilities in the future at a much

lower cost compared with the minicomputer system.

• **Price per user.** With a large minicomputer system supporting many users, the initial cost is great, but as users are added, the cost per user can get quite low. The initial cost of the microcomputer system, however, is very low; and the cost of add-

ing users is also quite low, therefore decreasing the price per user.

• **Decentralization helps in a crunch.** A computer failure is a problem no matter what the size of the company. One advantage a networked microcomputer system has over a minicomputer system is redundancy. If a minicomputer goes down, the entire system is rendered useless. In a networked microcomputer system, if one CPU fails, critical office operations can continue by running off the remaining computers.

• **Software.** A common misconception is that the minicomputer can run much more powerful software than the microcomputer. Today's 16-bit supermicros are capable of running software for most critical business applications, including accounting and word processing.

In some cases, the software was used and refined for many years on minicomputers before it was transported to the 16-bit environment. As a result, not only can today's supermicro user get the same powerful software available on the minis, he can be secure in knowing the software is proven.

• **Number of terminals.** Minicomputers have developed a reputation as medium-size to large computers that can support a large number of users. Many minicomputers effectively support very few simultaneous users or terminals.

• **File management and data bases.** Probably the primary reason most companies decide to automate is to store and manipulate the large amounts of data that are generally clogging the filing system. Each computer, whether mini or micro, performs that function. With a minicomputer, all files are stored in the host computer and are accessible to all users hooked to that computer.

It is the same with the microcomputer. However, users have immediate access only to those files in the system to which they are hooked. Files in other computers can be accessed through the network available on that particular computer.

If different elements of your organization maintain their own data bases, while only occasionally, if ever, referencing other data bases, then chances are good that the supermicro is all the system you will need.

Van Den Berg is vice-president of marketing for Fortune Systems Corp.

PROGRAM MAINTENANCE.

IT'S AN IDEA WHOSE TIME HAS GONE.

Most application programmers should really be called maintenance personnel: 60 to 80 percent of their time is consumed making "quick" patches. While the applications development backlog steadily mounts.

Fortunately, users of Microdata computer systems have a way to break the logjam: ALL: The Application Language Liberator.

ALL users define their applications on a series of menu-driven input screens. While ALL automatically builds the application from a comprehensive set of debugged, machine language building blocks.

ALL handles labeling, format definition and documentation according to predefined standards. So update and maintenance time is slashed dramatically. (Even when the original programmer has moved on.)

ALL cuts new application development that once took months down to a few days work. Major applications involving complex file structures, multi-level input screens, multiple report formats, menus, utilities, detailed math and logic functions, and security access provisions can be developed easily using the ALL system.

Imagine! Less maintenance. Automatic documentation. Faster development. Bye-bye backlog.

For more information on an idea whose time has come, write Microdata Corporation, P.O. Box 19501, Dept T-208, Irvine, CA 92713.

Microdata
SIMPLY POWERFUL

Microdata is a subsidiary of McDonnell Douglas Corporation.

© 1983

How do you get
a great software idea
off the ground?

Write it portable with language

Now every software developer can build applications that are fully portable from microcomputer to microcomputer...from 8-bit to 16-bit and even to 32-bit environments...from microcomputer to mini or mainframe...and for every popular operating system available today.

With Digital Research languages, you can design your applications once and be guaranteed that they'll work across different processors and operating systems.

This important advance in programming productivity is available because now Digital Research offers the most important commercial programming languages in sophisticated compiler implementations that are inherently portable.

Just select the Digital Research language that's best for your application: CBASIC Compiler,[™] Pascal/MT+[™], CIS COBOL[™], Level II COBOL[™], PL/I, or C. You'll find the dialect, high performance, development features and flawless execution you need to achieve outstanding performance in your applications package.

Working with Digital Research languages, you know that your software will get off the ground faster...and cover more ground in the computer world.

After all, who knows more about the value of portability than Digital Research, the creators of CP/M?

Ground-breaking innovations in productivity.

Programmers need more than just a language.

That's why Digital Research made all of our languages compatible with our complete workshop of professional quality software development tools.

Our Display Manager[™] and Access Manager[™] packages simplify the design of screen display and



ages from Digital Research.

file access routines, a tremendous savings in time and effort.

And our SpeedProgramming Package™ for Pascal/MT+, ANIMATOR™, source level debugger, and other productivity tools for COBOL, are invaluable in bringing your software up and running in record time.

Top Quality Technical Support Keeps You on Solid Ground.

Digital Research gives you the expert, responsive technical support you need...when you need it. Our language documentation is excellent—it provides you with full reference guides and how-to information. Plus, the DRI Hot Line puts you directly in touch with a large technical staff of superbly-trained people, 100% dedicated to resolving your problems and guiding you in your debugging efforts.

And to help you get the most from our languages, Digital Research issues extensive application notes at regular intervals and an ongoing series of training seminars.

Independent Software Vendors who develop software on our languages get the industry's strongest program of marketing assistance, and other benefits of Digital Research's long-standing commitment to ISV support.

When you depend on Digital Research languages and productivity tools, you're on very solid ground.

 **DIGITAL
RESEARCH™**



Digital Research has the best of everything in languages.

CBASIC Compiler

The best for sophisticated business applications.

CBASIC is the industry-standard commercial dialect of the popular BASIC language.

The original implementation of CBASIC as a pseudo-code interpreter conserves random access memory, allowing more memory for application programs. CBASIC Compiler is a direct enhancement of CBASIC that runs 5 to 10 times faster in execution than most BASIC Products.

Implemented as a native code compiler, CBASIC Compiler allows you to write, test and finally, combine separate modules to create completed programs. Multiple line functions can be externally defined and have local variables, much like the procedural, block-structured compilers of Pascal and PL/I.

This efficient, modular, top-down approach makes CBASIC Compiler programming significantly faster to write and easier to maintain. You are also given maximum flexibility to define your own extensions to the language.

CBASIC Compiler includes a fully-integrated set of graphics statements and functions. They provide a powerful, device-independent graphics capability, including figure drawing, a graphics character set, multiple line styles, flexible viewing area control and graphic input.

When you consider all its capabilities, CBASIC Compiler is the best language choice for programming in a sophisticated business environment:

- Native code compilation
- Multiple line functions externally defined with local variables
- Powerful graphic statements and functions
- 14 decimal digit accuracy

- Comprehensive 32K byte string processing
- Expanded file processing techniques
- Support of multi-user operating systems
- Compatible with Display Manager and Access Manager
- Compatible with CP/M Graphics™

Pascal/MT+

Best for work where programming speed and accuracy count.

Pascal is a highly-structured language originally designed for teaching programming. Data types are extensive and matched to your programming needs. These qualities, plus compactness and execution speed, have made Pascal highly regarded as a microcomputer development language.

Digital Research's Pascal/MT+ is a direct-compiling dialect of the full ISO standard Pascal—greatly enhanced and extended to maximize the inherent versatility and portability of Pascal. The Pascal/MT+ native code compiler executes much faster than traditional p-code Pascal compilers.

Pascal/MT+ supports floating point real numbers for scientific applications and decimal numbers for arithmetic precision in business applications. ROM-able code can be generated for industrial applications. And in educational environments, Pascal/MT+ is easily-learned and never outgrown.

Pascal/MT+ is the best software development tool available today. The Pascal/MT+ programming system includes a compiler, a linker, a run-time support library, a disassembler, and a symbolic program debugger. And Digital Research has developed a unique SpeedProgramming Package that locates syntax errors, a major timesaver in program development.

There is no better Pascal for program development:

- Superset of ISO standard Pascal
- Separate modular compilation
- Efficient native code
- ROM-able machine code
- Complete development tools
- Enhanced arithmetic functions
- Extended data types
- Powerful overlay capabilities
- Compatible with Display Manager and Access Manager
- Compatible with CP/M Graphics
- 8087 numeric processor support

Level II COBOL

The best for mainframe-level development.

COBOL (Common Business Oriented Language) is the most

widely-used language for mainframe computers. Today, the total investment in COBOL programming in the U.S. exceeds 100 billion dollars, greater than the Gross National Product of Switzerland.

Level II COBOL gives you the full facilities of mainframe COBOL on your 8-bit or 16-bit microcomputer, allowing you to develop mainframe programming with the interactive facilities of a microcomputer. Level II COBOL is the ideal choice for developing applications in a corporate environment where COBOL software and expertise are already present.

Level II COBOL is a mainframe-level compiler for ANSI 1974 COBOL meeting the highest possible standards: certified by the General Services Administration to "High with Zero Errors."

Digital Research also supplies software development tools to make Level II COBOL highly attractive as a development environment. Native Code Generators allow faster program execution than intermediate code, by providing translation

of the finalized program into highly-optimized native code that executes 5 to 10 times faster. The ANIMATOR logic display system allows the programmer to interactively observe and debug the logical path of program execution at the level of source code statements.

Considering the advantages of portability of software between mainframe and microcomputers, Level II COBOL is the obvious choice for large corporate environments:

- Inbuilt sort-merge capability
- Segmentation
- Inter-program communication
- Multi-key indexed sequential file handling
- Run-time specification of external file names and program names
- Use of dynamic paging to allow implementation of programs greater than 64K on 8-bit microcomputers
- Powerful interactive screen handling

CIS COBOL

The most popular COBOL for microcomputers.

CIS COBOL is the complete system for compiling, testing, debugging, and executing standard COBOL programs. It's called CIS COBOL because it is Compact, Interactive and Standard... and has become the most widely favored version of the popular ANSI 1974 COBOL language.

With CIS COBOL, you can run existing mainframe and minicomputer programs on your microcomputer. Or you can use a microcomputer to develop COBOL software for larger systems. Or you can create COBOL software to use on your microcomputers to take advantage of COBOL's powerful data processing functions:

- ANSI 1974 standard
- Compact intermediate code for running large programs
- Powerful interactive screen handling
- Dynamic loading of segments and called programs
- Support for all major COBOL file processing systems

Display Manager

The best way to achieve portability for your screen displays.

When you use Digital Research languages, there is no need to waste valuable development time formatting information for screen displays. Display Manager does it for you.

Access Manager

The best way to access large amounts of data.

Access Manager is an advanced multi-keyed file access system that saves valuable time in program development. This standard file access method creates compatible data bases which are accessible to all of Digital Research's

Display Manager provides you with a full-screen editor that works as a stand-alone system to help you design images that will run on any CRT terminal as part of your application programs.

Literal data as well as input and output fields may be placed anywhere on the screen. And Display Manager gives you full use of the visual dynamics available on modern terminals: blinking, inverse video, underline and half-intensity, and now... color!

- With Display Manager, programming is faster... and better-looking.
- Screen-oriented interactive editor
- Supports capabilities of modern terminals
- Complete control of input and output fields
- CRT device independent
- Separates screen design from programming
- Compatibility with Digital Research's full range of compiled languages

compiled languages. This flexibility becomes significant when using Access Manager in multi-user environments, where the system's file and record locking features are essential.

Access Manager is fast, versatile and intelligently organized for efficiency. Separate index and data files are maintained, eliminating the need to sort data files or reorganize indices when adding or deleting records. And the index can be read in any direction for faster access to data.

The result is a file access system that provides fast, efficient access, efficient use of disk space, and no overhead in file maintenance... with an important bonus of compatibility with a wide variety of languages. Access Manager provides invaluable savings in both program development time and program execution time:

- Multiple keys
- Automatic support for duplicate keys
- Indexed access to data records
- B-tree index structure
- Multi-user support with record and file locking
- Efficient memory utilization
- Compatible with all Digital Research compiled languages

PL/I

A high-performance professional programming language.

PL/I is a powerful, easy-to-learn, all-purpose language that rivals both FORTRAN for scientific applications and COBOL for commercial applications. This makes PL/I the best language to meet all the needs of a professional programmer.

Digital Research has created the first implementation of PL/I for microcomputers.

Based on the widely-

used ANSI Standard Subset G, Digital Research PL/I programs are easily ported from micro to mini to mainframe. And, by following a few simple rules, your programs are also portable from mainframe to mini to micro!

The Digital Research PL/I program development system includes an optimizing native code compiler, a relocatable assembler, a relocating linker, a library manager, a cross-reference generator and a comprehensive library of useful built-in functions. Together, these tools provide a fast, integrated system for developing your own scientific, commercial and system software.

Best of all, the programs you create with PL/I are extremely efficient. That's the result of the state-of-the-art optimization and decades of compiler experience behind Digital Research's PL/I. It's no wonder that only Digital Research can offer you PL/I for microcomputers.

- Structured control statements
- Fixed binary integers
- Single and double precision floating point
- 15 digit arithmetic
- Bit string operations
- Character string operations
- Full control of compiler storage allocation
- User controlled error handling
- Supports Display Manager and Access Manager
- Supports CP/M Graphics

C

The best language for systems implementation.

C is an advanced, elegant programming language built for coding power and execution speed with a minimum of constraints. C gives skilled software developers the ability to take full advantage of the inherent structure of the computer, including large model support on the 8086. C is ideal for performance-critical applications and systems-level programming.

The Digital Research C programming development system includes a feature-packed compiler, linker, and a comprehensive run-time library which contains a wide range of utilities. Digital Research C is a complete implementation of the C language, fully compatible with the UNIX™ standard C language. Built into the compiler is a sophisticated error-checking facility which contains many of the features of the UNIX program, LINT. The run-time support library handles everything from transcendental functions to input-output. Altogether, Digital Research C is an integrated answer to all your programming needs.

C is not for everyone. But for the experienced software developer, it is one of the most powerful programming tools available.

- Full C language implementation compatible with UNIX Version 7
- Single and double-precision floating point
- 8087 numeric processor support
- Enhanced programming/debugging tools
- Comprehensive utility package included
- Multiple 8086 memory model support

 **DIGITAL RESEARCH**



Our portability gives your software the best of all worlds.

	8080/8085/Z80 CP/M MP/M II	8086/8088/80186 CP/M-86 Concurrent CP/M-86 MP/M-86	8086/8088 IBM PC DOS	MC-68000 CP/M-68K
CBASIC Compiler	*	*	*	*
Pascal/MT+	*	*	*	*
C		*	*	*
PL/I	*	*	*	TBA
Display Manager	*	*	*	TBA
Access Manager	*	*	*	TBA
CIS COBOL	*	*		*
Level II COBOL	*	*	*	*
COBOL ANIMATOR	*	*	*	*
Level II COBOL Native Code Generator		*	*	*

And the best is yet to come.

Digital Research's ongoing development efforts in languages, graphics, and productivity tools express our continuing commitment to supporting important new systems and operating environments as they emerge.

That's your guarantee that your investment in software development will continue to return a maximum of utility and longevity, even as the microcomputer industry continues to grow and change at rapid speed.

The design quality, technological foresight and business integrity of Digital Research is reflected in the portability and upward-compatibility of our software products.

No other company in the world offers the scope and depth of microcomputer systems software that Digital Research does today.

But that's only the beginning. The micro-computer industry has a long way to go. And Digital Research is committed to lead the way by offering the best of everything for professional software development.

Get more background.

For more detailed technical information about Digital Research's languages, productivity tools, and graphics products — and the location of your local CP/M Library™ dealer — call (800) 227-1617, Ext. 400. In California call (800) 772-3545, Ext. 400.



The best of everything in professional software.

CIS COBOL, Level II COBOL and ANIMATOR are trademarks of Micro Focus, Ltd. UNIX is a trademark of Bell Laboratories, Inc. The logo, tagline, CBASIC Compiler, Pascal/MT+, CP/M, Display Manager, Access Manager, SpeedProgramming Package, CP/M Graphics and CP/M Library are either trademarks or registered trademarks of Digital Research Inc. © 1983 Digital Research Inc.

To Fight Back Micro Invasion

Mini Vendors Must Grasp Market Realities

By Elliot Friedman
Special to CW†

Things are looking pretty grim for minicomputer vendors in their traditional business.

Beginning in the late '70s, a combination of economic, technical and market factors conspired to halt the booming growth of the minicomputer industry. An economic downturn of major proportions was under way. Large-scale integration/very large-scale integration was evolving from a component in big computers to a full-fledged computer on one board.

This technological advancement was used to penetrate rapidly the minicomputer market by microcomputers from the low end and by compact mainframes, such as IBM's 4300 series, from the high end.

Mini vendors did not react to the changing world quickly enough. Abysmal management during the boom years (characterized by unfocused research and development, overnight reorganizations, inconsistent marketing and sloppy administration) had created organizational giants that were clumsy and slow to react. In short, minicomputer vendors missed the microcomputer boat.

Mini makers failed to recognize the new market that was emerging from within their traditional market. They failed to address the needs of the professional end user — needs that have become a litany for the success of the microcomputer industry:

- It costs less to start building a network of microcomputers, and the size of the network can be changed incrementally.

- Users control their own data and who has access to it on a microcomputer.

- Micro software is easier to use and there is more of it; there are thousands of companies developing software for microcomputers.

- A decentralized network of micros is not vulnerable to a shutdown when the central processor on one micro crashes. Response time is consistent, and there is no queuing time on a micro.

- A battalion of microcomputers costs no more on a per workstation basis than a mini with an equal number of terminals.

- The emergence of communications software for microcomputers allows networking, previously possible only on minis and mainframes.

Despite the phenomenal success of micros, it's a little premature to call your broker and short minicomputer stocks. The microcomputer penetration has made computer literacy a national imperative. That and the economic upturn mean a broader market, with some solid opportunities for minicomputer vendors.

Capitalize on Advantages

Minicomputer vendors are in an excellent position to capitalize on technological advances by exploiting their own advantages, especially in relation to the growing corporate market. The professional computing installation has hundreds of desktop

computers that require high-quality support, training and communications capabilities. Minicomputer vendors are prepared to meet the demands of that market now.

The big minicomputer vendors, such as Digital Equipment Corp., already have extensive marketing and support organizations in place that no micro vendor can match. They are better vertically integrated and have the economic power and experience to compete successfully in all phases of the small computer hardware and software business, including re-

search and development, engineering, manufacturing, distribution and support.

The newer micro organizations have grown up specializing in only one or two of these areas.

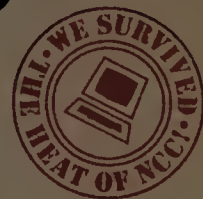
Minicomputer vendors started the easy-to-use, interactive software revolution. Operating systems developed by DEC in the '70s were the predecessors of Digital Research, Inc.'s CP/M and Microsoft, Inc.'s MS-DOS.

Minicomputer vendors are accustomed to linking together networks

of individual computer users sharing data and computing resources. They invented the concepts of distributed computing and distributed data bases and are ahead of the micro hoards in local-area networking.

Makers of minicomputers have been better at maintaining compatibility across a range of machine sizes than makers of larger and smaller systems, which means a smooth growth path for users. They have long-standing close ties to the academic laboratories, where advances

(Continued on SR/22)

Performance runs
in our family.

At WICAT, our primary objective is performance. This attitude has created today's most comprehensive line

of super-micro computers. In terms

WICAT provides the strength, speed, and flexibility to perform according to your company's unique requirements.

In the course of just two years, we have been successful in providing WICAT's customers with two operating systems (MCS and UNIX),

formance. Our software designers have concentrated on producing tools which formerly existed only in the mainframe or minicomputer environment.

This performance story began with the introduction of the first 68000 based microcomputer and now includes the installation and support of thousands of systems worldwide. Consider this a personal invitation to call us and get more information about the WICAT family.

of breadth of product, software support, and perhaps most importantly, WICAT is a performance company.

WICAT has created a family of supermicro computers versatile enough to meet virtually any computing requirement. Our systems support from 1 to 48 users, 256K to 14 MB of main memory and from 10 MB to 474 MB of disk storage. So from the fast single user desk top S-150 to the powerful rack mounted S-220,

9 programming languages, as well as word processing, data base management systems, a virtual electronic spreadsheet, and the WISE authoring system. This is per-

WICATsystems

P.O. Box 539 • 1875 South State • Orem, UT 84057 • 801-224-6400 • Ext. 241

Where to Turn When Mini-Micro Mania Strikes

By Sandra J. Kay
Special to CW†

The recent proliferation of mini-computer and microcomputer systems aimed at the small business market has created confusion among inexperienced people responsible for selecting a system from among the many vendor offerings.

When microcomputers arrived on the scene 10 years ago, professionals spent a great deal of time defining the differences between microcomputers, minicomputers, mainframe computers and distributed processing systems. Those definitions have been modified over the years and

will probably continue to be modified as vendors give new descriptions to their products.

For the purposes of this discussion, let's say that both microcomputers and minicomputers use microchip technology, but that microcomputers are capable of performing one task at a time, while the minicomputer performs multiple tasks simultaneously.

The decision of where and when to use computer equipment depends on the complexity of the task and the number of items to be processed. This type of logic applies to all automated equipment. Practical manage-

ment theory blended with general data processing knowledge provides the best method of matching computer equipment and computer software with the tasks to be performed.

Also, one needs to keep in mind that practical management theory advocates setting practical dollar limits on converting to any kind of equipment; computer equipment should be regarded in the same manner. To accomplish complex tasks successfully, higher limits of resources can be justified. Simple tasks or tasks specifically suited to a single-function system require fewer resources.

As mentioned above, microcomputer equipment and technology have been on the scene for at least 10 years. The delay in delivering micros to small business and the consumer has been in the refining of the manufacturing process and the writing of computer software.

Minicomputer manufacturers have integrated the micro technology and, with their existing customer base, have been able to offer a continuous flow of software products. But while minicomputer makers have had a jump on the small business market, they are finding their dominance difficult to maintain.

With the proliferation of inexpensive microcomputers, there has also been a proliferation of microcomputer "experts." These people, with varied backgrounds, have turned out volumes of software and are essentially responsible for the success of microcomputers today. With this success comes dollar rewards and more people claiming "expert knowledge."

Fortunately or unfortunately, almost anyone who is determined to solve an isolated problem using a mi-

(Continued on SR/24)

Mini Vendors Must Face Market Realities

(Continued from SR/21)

in artificial intelligence, decision support applications and voice and video computing are emerging. Mini firms are as well positioned as anyone to exploit the commercialization of these applications.

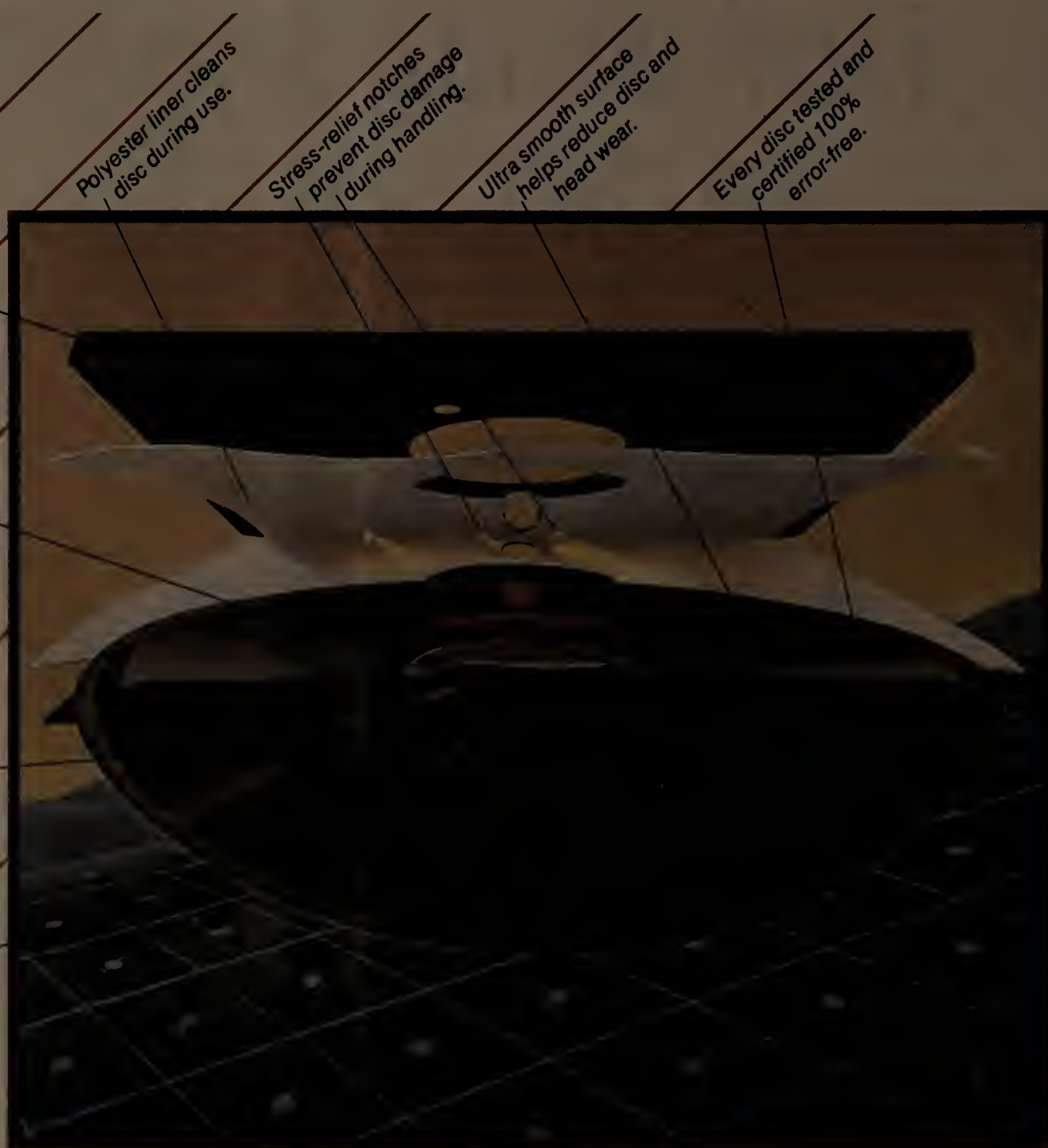
As micros enter the power ranges previously occupied by minis, software will become more sophisticated, integrated and comprehensive. Minicomputer makers already have powerful software along with old hardware that is relatively easy to replace with the latest technology. They also have experience in marketing, distribution and support.

Because of their experience with OEMs, minicomputer vendors are well positioned to provide supportive and sophisticated development environments for organizations writing software for the new micros. Even now, Pro Computing and Visicorp are using DEC's VAX-11 to develop integrated software packages, and Software Arts, Inc. is using Prime, Inc. minicomputers.

Accepting these facts as true, success for minicomputer vendors means exploiting their experience in software development and in distributed computing vis-a-vis the corporate market and the next generation of computers. It means shifting gears from selling a product to selling their capabilities to make, sell and support a product.

Minicomputer vendors can lead the pack again if they can get their management act together and deal with market realities.

Friedman is president of Pro Computing, which is based in New York City.



Polyester liner cleans disc during use.

Stress-relief notches prevent disc damage during handling.

Ultra smooth surface helps reduce disc and head wear.

Every disc tested and certified 100% error-free.

Extra stiff glue-sealed jacket allows easy loading.

Protective hub ring prevents edge damage.

Durable coating optimizes signal output and recording accuracy.

Protective anti-static lubricant prolongs head & media life.

We opened this quality disc to show how it stands up and performs.

On the surface, flexible discs look alike. But if you inspect them closely, Memorex® sets itself apart.

The cross-linked oxide coating is unique. It results in a coating that will hold a stronger signal for greater recording and playback accuracy. Each disc is burnished to an ultra-smooth surface to reduce head wear and extend media life. A protective hub ring on mini discs eliminates edge damage to the drive access opening resulting in better alignment and dependable performance.

For durability, we constructed a disc jacket from extra-stiff vinyl that loads easier. Glue-sealed to prevent intermittent bonding and stress-notched for added protection, discs withstand the rigors of everyday usage better.

We added a self-cleaning jacket liner that cleans and removes debris from the disc while in use. The result is top performance throughout a long disc life.

You can trust Memorex flexible discs. You know they're reliable because we individually certify every one to be 100% error free.

For any application—5¼" or 8" one side or two, single or double density—look to Memorex Flexible discs. For more information, call (800) 538-8200; in California (408) 987-1893 or your local distributor today.



MEMOREX
A Burroughs Company

Supermini Shipments Rising 31.9% Annually, Report Says

WELLESLEY, Mass. — Shipments of superminicomputers will reach \$4.8 billion in 1986, according to "The Superminicomputer Industry 1981-1986: Strategic Analysis," a study from Venture Development Corp. (VDC). Worldwide shipments will grow at a compound annual rate of 31.9% from \$1.2 billion in 1981, achieving one of the fastest growth rates of any product in the computer industry.

Because the term "superminicomputer" has been used to describe a great variety of computer systems, its usage is sometimes vague, VDC said. The report defines a superminicomputer as a CPU with an internal word length of 24, 32 or 48 bits; 1M byte or more of logical address space, maximum main memory capacity and maximum program size; and the use of a bus structure rather than the point-to-point structure typical of mainframes.

The new machines offer increased computing power, lower operating system overhead, cost-effectiveness and the ability to handle real-time and time-sharing applications.

Essentially, 32-bit superminicomputers are redefining the word "minicomputer." As a result, there will be a much greater range of power available in a 32-bit supermini-

computer by 1986, VDC predicted.

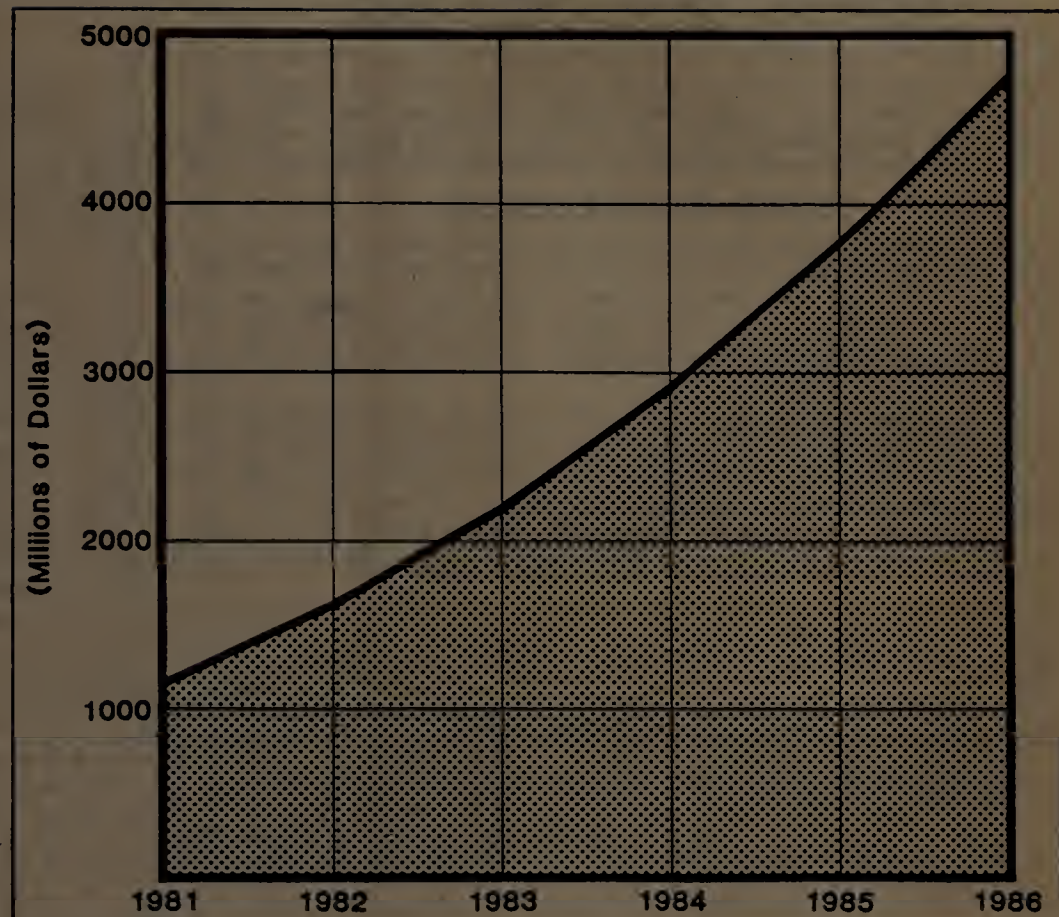
Superminicomputers are not a new technology. They are extensions of existing technologies. The system architecture, transistor-to-transistor logic circuits, memory chips and devices are all common technologies available to and used by minicomputers and other computer systems. Register sets and 32-bit-wide data paths draw upon the device characteristics, not upon any inherent underlying technology, the report stated.

Essence of Supermini

The essence of a superminicomputer is the 32-bit I/O bus structure that interconnects the subsystems of the computer. Harris Corp. superminicomputers are the only ones to use a 24-bit-wide or 48-bit-wide data bus, according to VDC.

The use of a 32-bit word not only allows twice as much data to be moved in the same period of time as a 16-bit pathway, but also can allow instantaneous access to a much larger data space.

The ability to address huge portions of memory leads to the second main attribute of a superminicomputer: the register length used in formulating the memory address must be 32 bits in length. The use of 32 bits



Venture Development Corp. Chart

Total Dollar Shipments of Superminicomputers

allows the computer to address directly up to 2^{32} or 4,294,967,296 memory locations vs. the typical 2^{16} or 65,536 locations that a standard 16-bit minicomputer allows, the report said.

"This huge address space is of tremendous value to both the systems designer and the end user. For the systems designer, memory protection and virtual memory schemes are much easier to implement with a 32-bit address space. Multitasking systems are also easier to implement. To the end user, 32 bits mean faster computation and easy handling of large numbers with great accuracy," VDC said.

The logical address space is much larger than with a 16-bit machine; VDC's definition specifies the logical address space to be 1M byte or greater. Such a huge address space allows the maximum program size to be very large — 1M byte or more. The maximum program size can be equal to or less than the logical address space.

Large program sizes combined with high throughput and 32-bit-

wide data paths are ideal for computation-intensive applications such as computer-aided design and manufacturing, simulation and laboratory analysis, as well as real-time data acquisition programs, according to VDC.

The most important trend in the minicomputer industry, the study said, has been the extension of vendors' product lines to include a 32-bit superminicomputer. IBM mainframes have used 32-bit structures for many years; now minicomputers have the potential to compete against mainframes. In fact, IBM plug-compatible manufacturers have used minicomputer architecture and 32-bit data paths to create high-performance computer systems.

The superminicomputer is often an extension of the vendor's 16-bit minicomputer line, sometimes using a superset of the instruction set. Using 16-bit software on a superminicomputer is difficult, however, due to differences in instruction format, lengths of subroutine return address on a stack and other factors, accord-

(Continued on SR/25)

Buy, lease or rent TI's new Professional Computer from MTI.



The new TI 850 - 150 cps, designed to be compatible with your desktop P.C.

We are distributors of Texas Instruments' full line of portable terminals, matrix printers and Professional Computers.

In addition to offering you rental and leasing opportunities, MTI's experienced personnel will train you on your equipment either in MTI's classroom, or at your company. And we carry the software packages you need. Database management, electronic spreadsheets, word processing and much more.

We also have a professionally-staffed service department and an extensive parts inventory, so that we can have your equipment up and running within one day of your call. And for those who want to save the expense of a service call, we offer depot service.

Whether you buy, rent or lease our equipment, you'll find MTI is the one source for all the terminals, peripherals, systems, applications expertise and service you'll ever need. At good prices. Call us.

New York: 516/621-6200, 212/767-0677, 518/449-5959
Outside N.Y.S.: 800/645-6530
New Jersey: 201/227-5552
Ohio: 216/464-6688



AUTHORIZED
DISTRIBUTOR
TEXAS
INSTRUMENTS
Data Systems Group

Applications Specialists & Distributors, New York, New Jersey and Ohio.
DEC, Intel, Lear Siegler, Texas Instruments, Dataproducts, Diablo, 3Com,
Hazeltine, Racal-Vadic, Digital Engineering, MICOM, Cipher, U.S. Design,
Protocol Computers, MicroPro, Microsoft, Polygon and Select.

UPGRADE WITHOUT AOS\$.

Create a productive AOS-like environment for your Data General NOVA* or ECLIPSE* with Wild Hare's TSS. This state-of-the-art Time Sharing System accommodates up to 26 users and is satisfaction guaranteed. Each user may run all standard Data General utilities and



languages such as COBOL, BASIC, FORTRAN, ALGOL, Assembler, etc., as well as independent software like SUPERCOMP™ word processors and a host of other applications. Also, each terminal is independent and can control multiple jobs.

wildhare T.M.
COMPUTER SYSTEMS INC.

NOVA and ECLIPSE are registered trademarks of Data General Corporation. SUPERCOMP is a trademark of Access Technology, Inc.

IBM 34/36/38

Para Research offers a different marketing approach for software. We provide the best software packages at lower prices. We do this to obtain volume sales, a larger user base and to encourage user feedback. This approach and the input of our many users have made us what we are today: the world's largest distributor of System/34 software. All packages are completely documented.

WORD PROCESSING

Easy Text, a new word processing system for the IBM Systems/34, /36 or /38, presents an easy-to-use system with on-line documentation. "How to Use Easy Text", a self-instructional feature, provides complete on-screen instructions in all word processing functions. Easy Text is so "user friendly" that users with little or no experience can generate letters, memos, reports and mass mailings almost immediately.

Create documents up to 99,000 lines or 2,000 paragraphs of text. Selective boldface printing, underscore, manual hyphenation, long-line entry, tabbing, automatic tabbing, automatic centering and optional new page printing. Now every work station on your computer can function as a word processor. Easy Text on the System/34/36 is \$750. On the System/38 it is \$1,500.

FINANCIAL MODELING

Easy Calc Financial Modeling System for the IBM System/34 or /36 combines the best features of the best electronic worksheets. Use Easy Calc for budgeting, cash flow analysis and sales forecasting with improved ease and power. Accounting tools such as return on investment, depreciation and amortization. Create a spreadsheet in only 15 minutes. Easy Calc allows you to create a format once and then store it for future use.

Build formulas of up to 96 characters. Block formula design allows for block calculation. Create worksheets with 52 columns and 999 rows. Consolidate 998 worksheets into one. And Easy Calc prints up to 9 integers to the left of the decimal. That's \$999,999,999.99! Columns vary from 8 to 14 characters. Built-in error detection actually pinpoints the exact position that needs correction. Easy Calc is designed for multi-work station environments. Choice of on-line or batch calculations. Learn Easy Calc in only a few hours. Available for the IBM System/34 at \$1,000 or the System/36 at \$1,200.

GENERAL LEDGER

General Ledger is a fully-automated package for maintaining business records. It offers maximum flexibility, ease of use and a variety of reporting options. Users can produce trial balances; detailed income statements and balance sheets; reports for individual transactions; and all department and expense statements. General Ledger accommodates 99 companies. Strategic Ratio, an additional menu option, provides financial analysis based on general figures. It produces 30 different ratios. General Ledger interfaces with other Para Research Accounting Systems. Available for \$1,000 on the System/34, \$1,200 on the System/36 and \$2,000 on the System/38.

ACCOUNTS PAYABLE

Accounts Payable reduces administrative and clerical costs, while allowing tight control over accounts payable functions. Various management reports provide timely and accurate information on the current status of all payables. The enhanced version allows you to: take a discount amount after discount date; select a single batch of vouchers for updating to open payables file; and report status of every vendor on a vendor analysis report. Available for \$1,000 on the System/34 and \$1,200 on the System/36.

PAYROLL

Payroll reduces clerical costs and gives users control over payroll processing. It provides up-to-date costs for every department in your company. The employee master files for salary, hours and other payroll items are easy to maintain, and user-friendly prompts provide instructions for each procedure. Payroll includes up to 9 deduction types for each employee. It will handle 99 companies and will run payroll processing for any combination of companies. Available for \$1,000 on the System/34, \$1,200 on the System/36 and \$2,000 on the System/38.

FIXED ASSETS

Fixed Assets, an easy-to-use depreciation scheduling program, helps users produce two-year projections. It figures depreciation for user-specified periods based on the 1981 Economic Recovery Act using the Accelerated Cost Recovery System (ACRS) plus eight other depreciation methods. Management reports track depreciation schedules, report changes in those schedules, give projections over a two-year period. Available for \$1,000 on the System/34, \$1,200 on the System/36 and \$2,000 on the System/38.

ACCOUNTS RECEIVABLE

Accounts Receivable improves bookkeeping efficiency and reduces administrative tasks. This system is available in either open item or balance forward methods. For both methods, the system has cycle billing capability and allows printing of all statements on file or statements for specific customers. You can obtain up-to-date status of customer records, including current balance, aging and credit checking. Available for \$1,000 on the System/34 and \$1,200 on the System/36.

BILLING

The Billing System provides order entry and invoicing capability as well as analysis of inventory and sale of items within your company. You can generate picking ticket listings by warehouse or item number and maintain data on orders before shipping and invoicing. The system places order quantities in reserve until you confirm the order, then reduces the quantity on hand. This allows you to enter freight charges before the invoice is sent. Available for \$1,000 on the System/34 and \$1,200 on the System/36.

INVENTORY

The Inventory System gives your company complete control over inventory, both on hand and on order. The system provides reports to let you know the status of every item at any time. You can determine inventory costs based on four methods: LIFO, FIFO, average cost and replacement cost. Up to 999 cost levels are available to value your inventory on a FIFO and LIFO basis. Available for \$1,000 on the System/34 and \$1,200 on the System/36.

PARA RESEARCH

Call or write Software Sales, Dept. CW14, Para Research Inc., 85 Eastern Avenue, Gloucester, MA 01930 (617) 283-3438.

Micros and Minis Will Coexist When Markets, Uses Are Defined

By Frank R. Jacobson
Special to CW

Today's minicomputers have many strengths that cannot be rivaled by microcomputers. Capabilities such as host computers, front-end systems, shared memory systems, clustering, message switching and networking all indicate the advantages of the minicomputer over the microcomputer in many application areas.

Existing manufacturers' operating systems, application programs and universal operating systems, such as Unix, all define markets and applications more suited to a minicomputer than a microcomputer.

The threat of microcomputers entering into the minicomputer markets is real. However, for many reasons, the micro and the mini will survive and coexist. Minicomputer manufacturers have become entrenched in the markets they currently serve to the extent that machines are

designed around certain applications.

For microcomputer manufacturers to seek out these applications and become experts will require some period of time.

An even more important element is that the minicomputer market has gone through several levels of "the survival of the fittest." The microcomputer industry is still trying to be all things to all people. This is why micro manufacturers will continue to fall by the wayside. When micro manufacturers find their niche, that is when minis and micros will finally coexist.

The defined marketplaces of both the micro and the mini are going to be fortified even more with the advent of universal operating systems such as Unix. The speed, capability, application and performance of an operating system such as Unix running on a mini cannot be matched by a microcomputer.

Software is the current strength of the minicomputer. The existing operating systems and the vast variety of application programs developed under minicomputer operating systems make entry into this marketplace very difficult.

Minicomputer manufacturers find that their customers may invest hundreds of man-years in developing application software to run on their systems. Because of this commitment by their customers, the manufacturers are forced to provide a path of migration from older models to their new, enhanced models.

The microcomputer manufacturer, in order to penetrate this market, must do an emulation of the operating system in order to salvage the application programs of the customer. This can be very costly to the microcomputer manufacturer, because even when the emu-

(Continued on SR/26)

Resources Determine Equipment

(Continued from SR/22)

microcomputer can produce a software program. However, the software program is only as good as the individual who wrote it. Therefore, microcomputer software can be either good or bad.

In the case of software for minicomputers, established vendors usually have software quality-control procedures that assure a certain amount of operational good.

Users can best decide what type of machine to purchase by:

- Looking at the tasks that need to be done. Are the tasks complex or simple?
- Looking at the amount of resources (dollars and people, for example), that they are willing to spend to automate the tasks in question.

Be sure to include the resource savings in manpower and problem resolution. Also, be certain to include additional resource costs required for using computers (such as purchase/lease, maintenance, software, space/environment, personnel, training and supplies).

What kind of help is available? Every salesman or self-made "expert" who has any indication of a possible sale of new equipment or of an upgrade to existing systems

will be at your doorstep. While you can gain a lot of knowledge by talking to many of these people, don't side with any vendor, salesman or self-made "expert" early in your initial analysis.

Also, remember that most of these people are looking for personal gain over and above the best fit for your particular situation. In some cases, the people have limited experience and knowledge of the computer field and know nothing about your business.

If you can locate someone who has been making management decisions or analysis about computerized processes for 10 or more years, use that experienced knowledge for general counseling. A person with general knowledge does not need to know every detail about any particular piece of equipment or software, but he can give you general ideas, keep your decision process on track and make you aware of additional areas that need to be considered.

For complex processes, you may also want to contact a reputable person or firm to provide a systems analysis. Most of all, unless you immediately know that your needs are simple or that you are

only willing to spend a small amount of money, delegate the decision process as a project to a logical, capable subordinate in your organization.

By doing this, you are more likely to manage the project assignment as you would any other project and will be better able to keep your people from getting caught in a net of buzzwords.

If managers properly consider the needs of their business, they should find the competition healthy with room for all kinds of equipment to meet a variety of needs.

Unfortunately, computers are marketed as a "solution to all the world's problems," with microcomputers costing less than minicomputers. Thus, a few managers who purchase solely for low cost will probably either decide that computers are too frustrating or admit that too little effort was put into an initial analysis.

Fortunately, the low cost of microcomputers will keep anyone from being hurt too seriously in the pocketbook and may automate some simple tasks for a lot of people.

Kay is president of Sandra Kay & Associates, Ltd.

Misconceptions Abound Among Users

Desktop Unit Purchases Need Careful Attention

By Mike Dawson

Special to CW†

With more and more microcomputers being placed on the desktops of executives and mid-level managers, non-DP personnel are now an integral part of the decision-making process.

As is often the case, these people are proven in business and finance, but unsophisticated in computer technology. Their lack of understanding of some subtle points of computer management can hinder their contribution to the analysis phase of the project.

Corporate users who know exactly what they want from their future desktop units may be filled with misconceptions about computers in general and microcomputers in particular. These delusions often go unspoken until after the units have been installed, making it the DP executive's responsibility to give voice to them early in the planning stage.

Microcomputer misconceptions basically fall into five categories:

- A microcomputer is a small unit and therefore a simpler buying decision. A micro is not a typewriter. It is a computer and is therefore subject to the same rigorous planning and analysis as any mainframe prior to purchase.

- Micros are cheap and therefore disposable. Don't be swayed by the Sunday newspaper ads offering microcomputers for \$999.99. Expect to spend around \$5,000, not including maintenance, for a unit that will serve a business environment. Most companies are buying micros for all executive and staff offices. That can easily generate a minimum order of 20 units, usually much more. That \$100,000 represents a sizable enough capital investment that one would be foolish to think of it as a "throw-away" commodity.

- I can play "what-if" games using my existing corporate data base. Electronic spreadsheets are extremely useful tools for management. However, these matrices can be large, and if the executive thinks that data is going to get into the matrix electronically rather than through manual keying, he has to take into account two considerations.

The first consideration is the availability of a communications interface that will enable a particular micro to communicate with the existing mainframe under the particular communications protocol already in use. Will modifications have to be made to the existing mainframe's data communications handler?

The second consideration is

whether or not there is summary data already available from the mainframe. Usually, those summaries on the last page of reports are calculated while the report is generated. They are printed and then thrown away. They are not kept in the computer. If a programmer has to be called upon to calculate and store that summary data and convert it for transmission to a format the micro can use, this represents a major project to support the micro-based network. Don't forget that most DP shops already have a heavy backlog.

- I can have access to a computer resource without being at the mercy of DP. There are thousands of packaged programs that can serve the executive well, but they are limiting in two ways.

They are written for the mass market so they may have features that are not needed and, worse, they may not have features that are needed. Sometimes these programs are sold to companies without the developer's name on them, making modifications impossible. But if a program can be modified or new programs can be written, plan on leaving those efforts to the DP shop.

The user who thinks he can wade through a Basic manual, do some exercises and get into the writing/testing/debugging business is kidding himself and his company. You are better off leaving this to the professionals.

Also, don't expect the same computing power from a general ledger package that costs \$350 as you would from a package that came with the \$75,000 general ledger system purchased for the mainframe last year.

- Security. Over the years, we have learned to put expensive locks and bullet-proof glass on our computer rooms and to establish elaborate security procedures. We have learned to do this the hard way.

If a micro is located in an office that is accessible to the public, its diskettes will occasionally be allowed to

lie around on a desktop. What will prevent an outsider who is cooling his heels before an appointment from walking out with a small diskette that contains your customer list or payables information? Any micro-processing decision made without a detailed discussion of security procedures for that decision could result in corporate disaster.

The key to a successful microcomputing network is doing the normal analysis and planning while making sure all contributing members are constantly aware of the importance of the total package price, the actual programming needed for implementation and development and security.

Dawson is vice-president of Flagstaff Software and Business Services, Inc., Flagstaff, Ariz.

Supermini Mart
Expanding Fast,
Study Reports

(Continued from SR/23)

ing to VDC. To overcome this, mode bits and other gimmicks are used to allow 16-bit software to run on the superminicomputer.

The purchase price of a supermini is normally between \$40,000 and \$300,000 for a complete system. As time progresses, the average price paid for a superminicomputer will fall, although the range may stay the same, the report predicted.

The definition of a superminicomputer has changed over the past five or six years. In the mid-'70s, superminicomputers were defined as Digital Equipment Corp. PDP-11/70s and Hewlett-Packard Co. HP 3000s. Today, VDC's superminicomputer definition excludes these machines because they are not 32-bit machines.

The report costs \$2,490 from VDC, 1 Washington St., Wellesley, Mass. 02181.

Buy, lease or rent the latest
Dataproducts line printers from MTI.Model B-1000
1000 lpm band printerModel B-600
600 lpm band printerModel BP-1500
1500 lpm band printer

We are authorized Dataproducts stocking distributors.
So we get them first, and fast.

Our Dataproducts printers range from 200 to 1500 lines per minute, are plug-compatible with all popular minicomputers, and cost thousands less than the identical printers from the minicomputer vendor. And there's no waiting. MTI also specializes in setting up remote line printer stations.

We also have a professionally-staffed service department and an extensive parts inventory, so that we can have your equipment up and running within one day of your call.

Whether you buy, lease or rent our equipment, you'll find MTI is the one source for all the terminals, peripherals, systems, applications expertise and service you'll ever need. At good prices. Call us.

New York: 516/621-6200, 212/767-0677, 518/449-5959

Outside N.Y.S.: 800/645-6530

New Jersey: 201/227-5552

Ohio: 216/464-6688



Applications Specialists & Distributors, New York, New Jersey and Ohio.
DEC, Intel, Lear Siegler, Texas Instruments, Dataproducts, Diablo, 3Com,
Hazelintine, Racal-Vadic, Digital Engineering, MICOM, Cipher, U.S. Design,
Protocol Computers, MicroPro, Microsoft, Polygon and Select.

UPGRADE
WITHOUT
UPGRADING.

Create an AOS-like environment for your RDOS, ICOS (CS/COBOL) and INFOS* systems without costly upgrading, re-programming, or personnel retraining. Wild Hare multiplies your system capabilities into true Multi-Lingual, Multi-User Time Sharing Systems



wildhare
COMPUTER SYSTEMS INC.

without any modification to your operating system. And Wild Hare also guarantees a 30-day trial run.

So why not upgrade with the Wild Hare who's now 30% smaller and makes you 100% better. With nearly 500 installations worldwide, Wild Hare is taming the market.

INFOS is a registered trademark of Data General Corporation

Execs See Micro Option as Fast Data Approach

By Anthony J. Paoni

Special to CW

Vince Sanchez, vice-president and general manager at First Chicago Corp., described typical executive management decision making as follows: "It's like the mating of elephants. It takes place at a very high level, there is much thunder and noise . . . and it takes two years before any results are evident."

Not so in the fast-paced world of microcomputers. It didn't take United Technologies Communication Co. Chairman Harold Gray two years to decide that the IBM Personal Computer and Context Management Sys-

tems, Inc.'s MBA software were right for United Technologies. As a result, 1,100 executives will attend a 2½-day training session and return to their offices where an IBM Personal Computer with MBA software will be waiting for them.

This scenario is being repeated in executive suites throughout the country. Top management is being educated to see quickly the potential of today's microcomputers.

This situation spells trouble for minicomputer suppliers that have successfully established a market niche and are positioned to leverage their organizations in the arriving

bullish economy.

As so often happens, the management ranks of most corporations are in need of computer literacy and are finding the microcomputer to be a simple, easy-to-use delivery system for that knowledge. This is not to say that the microcomputer is the best or worst system on which to learn the basics of computer technology, only that it is the most popular.

From the "Machine of the Year" coverage by *Time* [Jan. 3, 1983] through the "Computer Shock" edition of *Business Week* [Aug. 8, 1983], the media continues to use the microcomputer as a lightning rod for

attention. The continual barrage of advertisements in *The Wall Street Journal* further reinforces the management view that the only game in town is the microcomputer.

Surviving the Storm

If minicomputer suppliers are to survive the storm, they will have to strengthen the management awareness of their computers' value as an application solution to business problems. The microcomputer's ability to be utilized as a universal workstation will have to be weighed against the minicomputer's ability to offer multiuser environments, more muscle and more shared storage. The need for creative marketing to raise management awareness of perceived value is a critical element in the strategic success of minicomputer suppliers.

As more and more microcomputers are used to educate management, it becomes easier for managers to accept the "McDonalds" approach to learning. If you grew up in the McDonalds age of fast, convenient hamburgers, you may have replaced the generic term "hamburger" with "McDonalds."

If you were educated on the microcomputer, you may be predisposed to using it because of your own experience with its capabilities.

Paoni is president of Personal Computer Management, Inc., Wheaton, Ill.

Micros, Minis To Coexist As Marts Mature

(Continued from SR/24)

lation is achieved, performance is usually severely impaired.

More specifically, minicomputer manufacturers must clearly define the market segment they want to address. They must look at that market in terms of the fit of their products or proposed products. They must evaluate for that market whether their competition will be micros or mainframes to determine if the mini is best suited for that application.

Then, and most important, they must customize their systems to achieve maximum performance for their customers. This customizing must include hardware, software and, if necessary, price.

While the minicomputer is unlikely to take over the microcomputer market, defined markets and applications that are more suited to either the minicomputer or the micro ensure their coexistence.

Another area often overlooked is the technological advances that are enhancing both the micro and the mini. Micro-coded and microprocessor peripheral controllers and peripherals are enhancing the performance of the minicomputer.

With an aggressive "open-eye" approach, the minicomputer manufacturer will coexist with microcomputer manufacturers.

Jacobson is president of Second Source Computers, Inc.

LEVEL 6/DPS 6 USERS:

THE ONLY THING THAT'S MINI ABOUT OUR FINANCIAL MANAGEMENT SOFTWARE IS ITS PRICE.

Because the ICS Financial Management System was designed to run on Honeywell Level 6/DPS 6 minicomputers, we were forced to give it a minicomputer price.

However, nobody forced us to give it minicomputer performance.

So we didn't.

In fact, we designed a system that's so powerful it has actually outperformed mainframe systems costing twice as much.

The ICS Financial Management System consists of complete general ledger, AP, AR and

payroll systems. Plus fully-functioning order entry, inventory, purchase order and work order modules. All under the watchful eye of the industry's finest system control program.

It's a true multi-level system capable of handling an almost unlimited number of companies. Or departments and divisions within companies.

And it's completely interactive and on-line. As a result, any entry you make will be automatically posted everywhere else it's applicable. Immediately.

In addition to all of these features, our Financial Management System has more bells and whistles than a model railroaders convention.

Up to 14 accounting periods. 20-character account numbers. Simultaneous cash and accrual accounting capabilities. Automatic recurring and reversing journal entries.

Five levels of system security. A page-controlled print spooler. And enough prompts, help facilities and user-aids to guide even a bit-brain through the system with nary a snag.

So you see, our Financial Management System has everything you need to satisfy the financial types in your organization.

In fact, they'll even like the price.



**Independent
Computer Systems, Inc.**
8686 North Central Avenue
Phoenix, Arizona 85020
(602) 944-9693

Superminis Have Rosy Future as 'Hybrid' Hosts

By Frank Madren
Special to CW†

Much attention has been focused of late on the microprocessor revolution. This revolution has affected the way many professionals handle the information needs of their work environments.

While many microcomputers are used in individual applications, microcomputer networking and the need to access more computer power and high-powered peripherals has led to a growth in "hybrid" systems — networked combinations of computers of varying levels of power.

Superminis will play a major new role in this marketplace as hosts to the network of smaller systems. Supermini growth over the next few years will match that of microcomputers in compound annual growth rates.

Microcomputers and the new supermicros have accelerated computer understanding and acceptance in a broad sector of the population. As an extension of the distributed processing trend initiated by minicomputers in the '60s, micros have made computer power both highly accessible and inexpensive enough to attract the interest of the professional population outside of the computer room.

Microcomputers excel at providing local computer power to streamline individual manual activities

THE COMPUTER GROWTH RACE

PROJECTED ANNUAL GROWTH RATES:
1981-1986

SOURCE: DATAQUEST INC.
FINANCIAL WORLD 10-82



Figure 1

(such as spreadsheets, word processing and design and documentation tools for engineering and software development). As microcomputers fostered comfort, they also fostered the desire for increased computer power and the ability to communicate and share data.

Much of the impetus toward solving this new computer power crisis is directed toward more sophisticated

operating environments and microcomputers. To a degree, the networking of micros or the concatenation of microprocessor chips into a supermicro will answer the need for increased communications between individual computing activities.

However, major power increases will be recognized as microcomputer

networks and individual workstations are combined with high-end minicomputer power to provide for the large computing jobs and massive storage requirements that are not well served by dividing tasks among numerous microcomputer systems.

A hierarchical arrangement of micros and superminis will provide the balance of computer services necessary to meet the growing demands of the professional work force.

Although the delineations between the different classes of computers have become increasingly blurred as vendors strive to associate themselves with the next higher level or to differentiate themselves from others in their class, there are several rules of thumb to follow in determining the various classes of computing power — the needs the computer is intended to satisfy and a comparison of the relationship of that category to other standards.

Micros are oriented toward individual tasks; superminis and mainframes are oriented to handle large volumes of data and feature systems targeted to large computing jobs and/or on-line numbering from 16 to upwards of 100.

Some characteristics of these large-
(Continued on SR/30)

Now you can buy, lease or rent
Digital's new Rainbow 100
personal computer from MTI.



The new Digital LA50, 100 cps in draft mode, 50 cps in memo mode. Multiple fonts. Bit-map graphics — perfect for the personal computer.



We are authorized distributors of Digital's terminals, printers and personal computers.

In addition to offering you rental and leasing opportunities, MTI's experienced personnel will train you on your equipment either in MTI's classroom, or at your company. And we carry the software packages you need. Database management, electronic spreadsheets, word processing and much more.

We also have a professionally-staffed service department and an extensive parts inventory, so that we can have your equipment up and running within one day of your call. And for those who want to save the expense of a service call, we offer depot service.

MTI is one of the few Authorized Digital Terminals Distributors, so we can give you the best of two worlds; terminals, based on advanced technology from the industry leader, and the expertise and service from applications specialists.

Whether you buy, rent or lease our equipment, you'll find MTI is the one source for all the terminals, peripherals, systems, applications expertise and service you'll ever need. At good prices. Call us today.

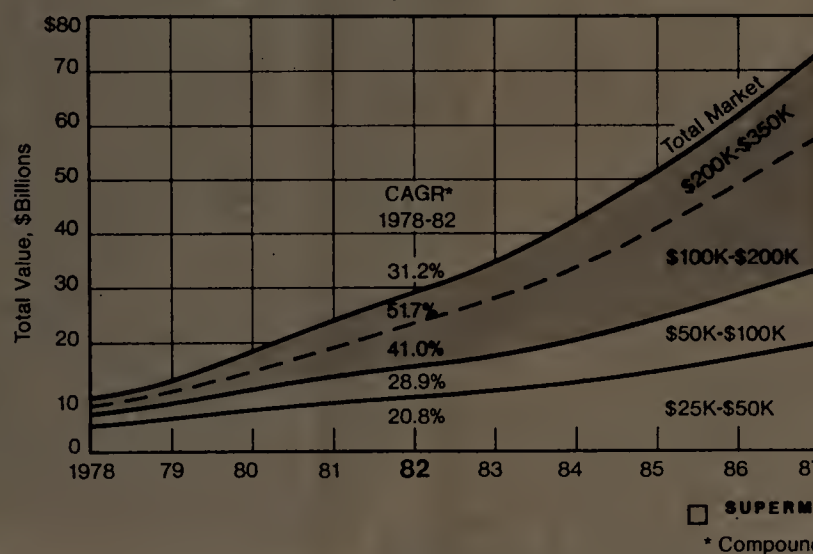
New York: 516/621-6200, 212/767-0677, 518/449-5959
Outside N.Y.S.: 800/645-6530
New Jersey: 201/227-5552
Ohio: 216/464-6688



AUTHORIZED digital TERMINALS DISTRIBUTOR

Applications Specialists & Distributors, New York, New Jersey and Ohio.
DEC, Intel, Lear Siegler, Texas Instruments, Dataproducts, Diablo, 3Com,
Hazeltine, Racal-Vadic, Digital Engineering, MICOM, Cipher, U.S. Design,
Protocol Computers, MicroPro, Microsoft, Polygon and Select.

Worldwide Small Systems Market by Price Class



□ SUPERMINI CATEGORY
* Compound Annual Growth Rate

Pyramid Technology Corp. Chart

Figure 2. The Market for Superminis

UPGRADE
WITH
WILD
HARE.
COMPUTER SYSTEMS INC.



To put a Wild Hare in your Data General, call us today!

P.O. Box 3581 Boulder CO 80307 303 442 0324 TWA 910 940 2518



At last, help for companies wrestling with the problems created by personal computers.

"Overrun."
"Invaded."
"Swamped."

DP managers use a variety of terms to describe the arrival of so many different personal computers on the business scene. But the *feeling* is always the same.

After all, most managers have spent *years* developing well-controlled information systems. Now, almost overnight, they are losing control.

And while there's no arguing that PCs are valuable tools for individual productivity, everyone would prefer a more integrated approach for the company.

What's needed is a system that combines corporate data base capability with the personal computer capabilities employees now insist upon. A system with the capacity to extend the functionality of the corporate network to the individual local level. This is exactly what Honeywell has built.

The microSystem 6/10.

The cost-efficient microSystem 6/10 is a multi-personality workstation that provides an impressive range of functions – including networking.

Besides personal computing, the system handles data processing and word processing. It can function as a network end-point and a termi-

nal emulator. What's more, power and flexibility make the microSystem 6/10 perfect for adaptation to industry-specific applications.

The microSystem 6/10 helps ensure organizational unity through excellent communications – it talks to IBM mainframes as readily as to our own.

It also offers expandable hardware and our time-proven GCOS operating system, which is compatible across the entire range of Honeywell minicomputer products, including even the most powerful 32-bit systems. This compatibility assures easy progress along your growth path by eliminating the need to re-create applications and retrain personnel.

Fight fire with fire.

Best of all, perhaps, the microSystem 6/10 will be an immediate hit with employees wed to their PCs. Because it accepts popular software packages based on CP/M-86® and MS-DOS,® chances are your people won't have to give up their favorite programs.

The microSystem 6/10.

Here's the way to win the battle against "PC Pandemonium." And the war for control.

For more information, call **800-328-5111** ext. 2706 (in Minnesota call collect 612-870-2142) or write to the Honeywell Inquiry Center, 200 Smith Street (MS 440), Waltham, Massachusetts 02154.

Together, we can find the answers.

Honeywell

'Hybrid' Host Role Ensures Minis Rosy Future

(Continued from SR/27)
er systems follow. The CPUs of these machines are proprietary to vendors and incorporate micro-programmed instruction sets. The CPUs were designed using fast Schottky transistor-to-transistor or emitter-coupled logic. Typically, this provides a performance level as yet un-

reached by the MOS technology of microprocessors.

Dedicated consoles are provided for the systems manager. High-speed bus bandwidths run from 12M bytes upwards. Disk capability is normally ½G byte or larger, and main system memory is counted in multiple megabytes.

Software has been developed over time to include languages with optimizing compilers, virtual memory that does not sacrifice performance and sophisticated operating systems and utilities that can schedule and execute many big jobs without getting bogged down.

In other words, these

large machines are used where there is intensive computing work to be done on a sustained basis.

While much of the emphasis today is placed on the effects of the microcomputer on today's business, Dataquest, Inc. forecasts that superminis will enjoy the same high compounded annual

growth rate — in the 40% range — as the microcomputer class (see Figure 1 on SR/27). These figures tend to bear out the contention that there are two clear needs patterns and that there can be a symbiotic relationship between these two dynamic areas of the marketplace that answer those needs.

One of the major issues to date in planning the integration of micros into larger computer systems has been the lack of compatibility. The Unix standard makes this less of an issue.

Hierarchical Integration

With the Unix emphasis on high-level language programming and with the availability of standard operating protocol across all computer classes, the hierarchical integration of different levels of computing power can be realized with a high degree of ease.

There are well over 90 separate microcomputer manufacturers that are providing systems oriented to the Unix operating system. Unix is also available for a significant number of mini, supermini and mainframe computers.

An entire departmental network can now be designed using the same fundamental operating principles and development criteria. Tasks can be divided to match the power and needs of the class of station that will be assigned to handle the task.

Much of the growth in the small systems market (traditional minicomputer territory) is seen in the high end of the range (see Figure 2 on SR/27). Along with traditional functions, such as departmental computing and software development, much of the growth will be tied to the emergence of the microcomputer workstation/supermini hierarchy of information management.

Eileen Skrabutenas of Yates Ventures calls Unix the "glue" that allows the networking of different classes of systems and a key contributor to the growth of both superminis and micros.

An area that highlights this hierarchical computing trend is the automation of the engineering professional. Most new engineering software is being written for Unix-based machines.

As such, the varying phases of an activity can be assigned or reassigned to different parts of the network. Finite element analysis, for example, is divided into

(Continued on SR/32)

Four-Phase introduces The Series 2000...

...for people who thought
automating their office was beyond them.

Congratulations!

You'll hear that a lot when you make the Series 2000 your first step into automating your office. And it's a pretty economical step, too. But that's the beauty of the new Motorola microprocessor-based Series 2000 system from Four-Phase. It's three different, integrated systems that let you start small with 8/16-bit computers like the one in our picture, then move into more powerful MC68000-based 16/32-bit machines later on. They're ideal for automating a single office, or connecting all your regional or branch offices together. And the systems are so easy to install and use, you can celebrate your first day of automation the same day your system arrives.

So what do you get for your investment? The entry level System 220 features the powerful 6809E microprocessor and gives you up to four easy-to-use workstations. The ISOS operating system inside lets you run a wide variety of business applications such as order entry, inventory inquiry, text editing and electronic worksheet. Getting started couldn't be easier.

Then there's the System 240 to which you can upgrade as your applications grow. It will give you up to eight workstations and all the memory capacity you'll need to support them.

If you need more capacity than the System 240, move straight to the sophisticated System 260. It's the bridge between today's requirements

for low cost, and tomorrow's demands for high performance. The System 260 is a 16/32-bit computer based on Motorola's MC68000 microprocessor. It comes with up to eight terminals and features a powerful operating system derived from UNIX™. System III under license from AT&T. You'll enjoy working with the Series 2000, and all the productivity it will bring you. And if your friends don't believe how inexpensive it is to get started in office automation, just tell them who to call. Four-Phase, the leader in office automation technology, service and support for over a decade. And now, part of Motorola, the leader in microprocessor technology. Call 1-800-528-6050, Ext. 1599. Or write us at 10700 North De Anza Blvd., Cupertino, CA 95014. M/S 52-10A7.



MOTOROLA INC.
Information Systems Group



Four-Phase Systems
The Office Automation Company

Four-Phase and the Four-Phase logotype are registered trademarks of Four-Phase Systems, Inc. Motorola and (M) are registered trademarks of Motorola, Inc. UNIX is a trademark of Bell Laboratories.

Micro or Mini? It Depends on Size of Business

By Richard J. Surdez

Special to CW†

What's a data processing manager to do: stand by the traditional mini-computer method of satisfying the company's data processing requirements or disseminate personal computers throughout the organization to serve the needs of individual users?

This conflict is really a "what's good for me" vs. "what's good for the company" situation, an unhealthy environment in which there can be no winner.

Individual corporate users can solve their own requirements with the purchase of micros or personal computers of various shapes and sizes, but they usually neglect to consider the overall information-sharing and communications abilities of their systems required to make their businesses function and grow.

On the other hand, a minicomputer is extremely powerful and can certainly accommodate the current and future data processing requirements of a business. But does it attempt to meet the individual needs of clerks, secretaries, executives and other employees who would benefit from the availability of such productivity tools at their own workstations?

Ideally, the best solution would be a system that provides both individual and corporate functions com-

'A minicomputer with multiple workstations can meet . . . local requirements at a more cost-effective rate per workstation than is possible with an array of micros. [It] can allow resources to be shared among all users and can also serve as the network link to obtain and provide data to the mainframe.'

bined in a single networked solution. Such a system would address the needs of the entire organization, which include those of the individual, the department, the company (intracompany) and the corporate structure (intercompany).

The size and scope of the typical small business make communication and information sharing easy. Given this, the small business selecting a mini or micro is confronted with a less complicated decision than that faced by a larger organization.

A small business will usually require automation in only a few key areas, all of which involve a select number of applications and individuals. For example, the accounting department may require a micro to generate key account management reports and financial statements, while office automation functions such as financial and "what-if" analysis do not justify the use of a computer.

The large organization, which will usually conduct business from a number of geographically dispersed locations, must select a system that can distribute the work load among various locations as well as provide a communications path back to the central site.

Clearly, a minicomputer with multiple workstations can meet the local requirements at a more cost-effective rate per workstation than is possible with an array of micros. The mini can allow resources to be shared among all users and can also serve as the network link to obtain and provide data to the mainframe.

Ideally, this network system will also provide individual office productivity tools to its users by supporting a personal computing function. If this is true, the advantages of the micro quickly disappear when compared with the multifunctionality of a workstation in a distributed data processing (DDP) environment.

As an example, the availability of Digital Research, Inc.'s CP/M on a DDP system provides users with the advantages of a personal computer without having them sacrifice the superior networking or shared resource processing, storage and printing capabilities of a full-function DDP system.

Users can access remote host computers or local shared data bases as well as the more than 2,000 software packages available under CP/M. CP/M on a DDP system expands the versatility and flexibility of the system without the addition of new hardware. Peripherals and software are shared by users, thus minimizing overall costs.

An added benefit of this approach is the control and compatibility of systems within the organization. Current and future requirements can be planned for and implemented within the network because of the inherent compatibility of hardware and software.

It simply becomes too costly to configure a micro with the storage and communications required to participate in the communication of information throughout the organization. Until local-area network standards become well established and easily implemented, the minicomputer, with personal computing

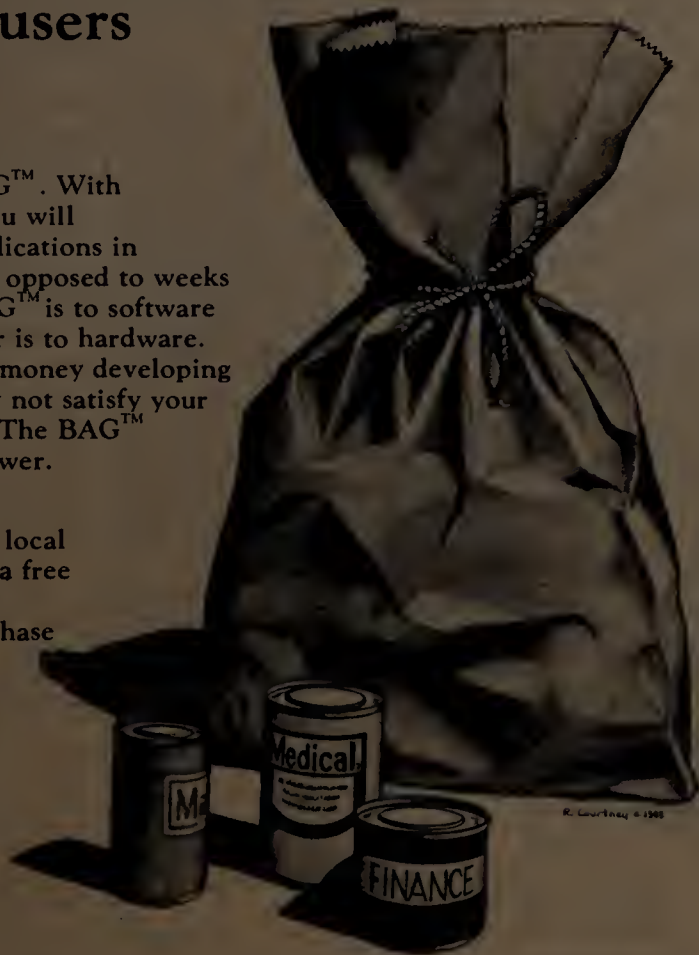
(Continued on SR/32)

AT LAST!

an easy to use, easy to learn
applications generator for
CP/M* users

Introducing The BAG™. With this new software, you will develop business applications in minutes and hours as opposed to weeks and months. The BAG™ is to software as the microprocessor is to hardware. Why waste time and money developing applications that may not satisfy your future requirements. The BAG™ is the only viable answer.

Take this ad to your local computer dealer for a free demonstration and \$100.00 off the purchase price.



Remember: If it's not in the can, it's in The BAG™.

CANNED SOFTWARE CORP.
..... IT WORKS

800-641-2034
417-781-0298

*CP/M is a registered trademark of Digital Research Inc.

Viva Italia

**Now you can
speak Italian to 35,000
DP professionals.**

Computerworld/Italia, one of the latest additions to our international network of publications, brings the high quality of editorial that is associated with *Computerworld* to the Italian DP market. Its circulation consists of 35,000 DP professionals in computer user environments throughout Italy including the leading decision-makers in the various industries. *Computerworld/Italia* is published weekly.

The Italian computer market is expected to reach sales of over \$1 billion in 1983. The booming demand in every category of the Italian computer and peripherals market provides excellent opportunities for U.S. manufactured equipment. The single largest buyers of computers in Italy at this time are manufacturers.

CW International Marketing Services can give you one-stop advertising services in countries around the world. For more information on *Computerworld/Italia* or any of our other foreign publications, just fill out the coupon below.

Diana La Muraglia, Manager, International Marketing Services
CW COMMUNICATIONS, INC.
375 Cochituate Road, Box 880, Framingham, MA 01701 • (617) 879-0700

Please send me more information on
☐ *Computerworld/Italia* ☐ Your other foreign publications

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____



CW COMMUNICATIONS, INC.

Publishers of *Computerworld* and other leading computer publications around the world.

Checklist of Needs

Does Your Company Require a Minicomputer?

By Larry Boyd
Special to CW†

When a company's needs require changing data into information, minicomputers have many advantages over micros. Not all businesses have the need for a minicomputer, and many do not know how to decide whether or not they do.

A small business with few employees and products normally does not need a mini and often cannot afford the investment. But a business with many clients and products could benefit greatly from the information a mini can make available.

A basic checklist for whether or not a business needs a mini would include

the following:

- Large amounts of data.
- A number of users using the same applications concurrently.
- A number of applications accessing the same core data.
- A number of applications accessing several sets of data banks.

One advantage minis have over micros is that many users can access the same information simultaneously. For example, a business that has 5,000 clients and a hundred employees may wish to have accounts receivable, accounts payable, payments receivable, client history and word processing on its system.

By making available a core

data file of the names and addresses of all current, past and prospective clients, in addition to all employees, these systems can be integrated to allow 50 to 75 users at one time.

Concurrently, a form letter can be written to prospective clients; five collection terminals can access up-to-date information on past-due clients; 10 accounts receivable terminals can enter daily receipts; and 25 telephone operators can maintain sales information.

With micros, there is duplicate information spread out on many disks. Account payments, entered by the accounts receivable department, do not automatically appear on the collection department's disk.

Mini Grows With Business

As the company grows, so can the mini. Many micros are very limited as to the number and size of disk drives they can support online. You can change disks quickly with micros, but

with minis there is less need to change disks because the information is always online.

If another disk drive is necessary for the mini, it can be purchased and put online in a relatively short time, allowing for more information growth.

Backup is necessary with any computer system. With micros, it is difficult to keep current backup available to all users. Users can be asked to back up their own data, but often there is "not enough time" or the user "forgets how."

With minis, the backup is controlled by the management information systems (MIS) department. This allows for more consistent and correctly executed backups. The mini can also back up more information faster than a micro.

Users, of course, like to have control over their own systems. Often, users do not believe the MIS department can produce what they want now. They claim that with a

micro they can produce their exact needs.

Although this is somewhat true, with the correct tools available on minis, the users can design, build and execute their own small systems.

The main advantages minis have over micros is data control and security. If an unauthorized employee has a micro at home, he often has the ability to access secured data with no one's knowledge.

Because of necessary sign-ons to minis, this can be observed by computer operations. It is not possible to keep an employee who thinks he is a computer whiz, and is, out of any system, but with a mini the employee who wants to "experiment" can usually be deterred.

The control of information in a growing business is important to monitor. Keeping all information correct is hard enough on a micro, because of disks that float from

(Continued on SR/34)

Mini or Micro Decision Depends on Size of Firm

(Continued from SR/31)

and communications capabilities, offers the best route to automating larger organizations successfully.

On a smaller scale, a department is to a small business what a company is to the corporate organization. Depending on its size, a department's needs may be satisfied by a micro or by a small mini depending upon how many people need to access the information.

Both should be able to communicate messages and data to other departments if a truly automated solution is

to be implemented.

The automation need not, and in all likelihood cannot, take place all at once. But the staged implementation must have full automation as its ultimate goal.

What's a data processing manager to do? He should choose the best of both worlds: personal computing fully integrated with his organization's data processing/data communications network.

Surdez is the director of product line management for Mohawk Data Sciences Corp., Parsippany, N.J.

Superminis to Host Small Systems

(Continued from SR/30)

three main phases: preprocessing, processing and postprocessing.

Preprocessing is highly interactive.

It involves defining the form, material properties, boundary constraints and load or displacement pat-

terns of the problem.

While the resulting file requires from 1M byte to 10M bytes of mass storage, the process of definition can typically be handled at a microprocessor-controlled workstation.

Likewise, the computed results, which are normally

expressed as plots, can often be reviewed and edited on micro-based graphics workstations.

The processing phase, however, is more appropriately handled by a supermini-class machine.

Medium to large-size problems can require 10M bytes to 100M bytes of scratch files and can occupy up to 95% of the CPU time, a very good argument for off-loading preprocessing and postprocessing operations.

A complex problem may tie up a Digital Equipment Corp. VAX 11/780-class system for several hours as the program forms and solves tens of thousands of simultaneous equations.

The computer industry has been well served by the introduction of the microcomputer and its emphasis on standards.

As the industry shifts to accommodate this latest level of distributed processing, it also acknowledges a rebirth of the need for centralized functions.

The supermini/micro combination offers a new level of productivity and flexibility in the distribution of information manipulation and handling activities.

Madren is vice-president of marketing for Pyramid Technology Corp. in Mountain View, Calif.

"Before, I couldn't get a document from our computer to our word processor."

"Before Soft-SwitchTM, that is."

"It used to be difficult to share information at our company because our office equipment comes from different vendors. Consequently, when we needed a finished document, all of the information had to be re-keyed for the word processors.

"Not any more. Soft-Switch lets us exchange all of that information intact, with no document clean-up.

"Soft-Switch is a Document Control System from ITI, and it runs on our IBM mainframe. It permits documents created on one type of equipment to be used by other devices, regardless of the vendor (word processors, personal computers, printers, etc.).

"Soft-Switch gives us extensive edit level translation capabilities. It stores documents in libraries on the mainframe—no more hunting for

diskettes for last year's reports. And routing is simple and efficient. Whether the document goes to storage at the mainframe, or to a device across the hall, or to 25 branch offices around the country, Soft-Switch requires just one command. Conveniently, the recipient gets the document directly from the mainframe. This is especially useful when you route across time zones.

"It's simple to install and doesn't need much maintenance. The staff likes it because it's easy to use, requires very little training, and just about eliminates document back-up.

"Soft-Switch supports both MVS and VM/CMS operating systems, and it's the first Document Control System that's fully compatible with IBM's DIA/DCA.

"Soft-Switch is available for most major OA

equipment. And if you don't have a mainframe, you can still use Soft-Switch by time-sharing through CIsNetwork Corporation.

"For years you've been hearing about 'integrated' offices.

Well, now you really can integrate what you want, when you want—with Soft-Switch. Check it out. Call ITI."



Integrated Technologies, Inc.

... we integrate technologies

200 North Warner Road
King of Prussia, PA 19406
(215) 768-9330 • TELEX: 469600

IBM is a registered trademark of International Business Machines Corporation.

A lot of companies would like to run as smoothly as Charlotte County.



Charlotte County, Florida, is one of the fastest growing counties in America. And its government is one of the most efficient.

In fact, visitors have come from as far away as Europe to study Charlotte County's computer system. A Nixdorf computer system.

As Oliver Lowe, Charlotte County's Property Appraiser, and the driving force behind the implementation of the Nixdorf 600/55 computer system, puts it, "One of the primary obligations of any government agency, regardless of size, is the elimination of unnecessary expense and duplication of effort. With the Nixdorf system, we are able to meet the data and information processing needs of all county departments, and at the same time, make the information used by one organization available to any other department that might need it. We're comparable with private enterprise when it comes to efficient management."

The Nixdorf system handles the complete range of the county's administrative functions from property appraisal, tax collecting, license and registration renewals, payroll, and mosquito control to a number of law enforcement requirements.

Another reason for the selection of the Nixdorf system, according to Mr. Lowe, was its ease of use. The system is being run by people who had never operated a data processing system before. No computer specialists had to be hired. And that's a major factor in Charlotte County's ability to save hundreds of thousands of dollars.

For 31 years, Nixdorf has been providing solutions for the information processing needs of all kinds of businesses, as well as government agencies at the local, state and Federal level. And today, we're a successful international company with 16,000 people and over 110,000 computer systems installed around the world.

So if you want the best system of government, with all the software and support you could ask for, all you have to do is talk to Nixdorf.

Nixdorf Computer Corporation,
300 Third Avenue, Waltham, MA 02154

NIXDORF
COMPUTER

Despite Dire Predictions, Mini's Future Is Bright

By Gerry Petri
Special to CW†

Despite the predictions made one and two years ago that minis would be supplanted by the burgeoning array of microcomputers, the future of minis has never looked brighter. Ironically, this is due in large part to microcomputers.

First, microcomputers have helped take automation power into markets and companies that had never used computers before. Experience demonstrates that once any company gets a taste of what a computer can accomplish in savings of time, personnel and money, the demands on

the computer system expand rapidly. A company that bought its computer to do payroll or mailing lists now wants to carry out applications involving inventory control, point-of-sale and materials handling. The company's terminal requirements jump from one or two to 25, 40 or more terminals.

At this point, these kinds of requirements become a minicomputer's best friend. Minicomputers have the effective power and the sophisticated, proven operating systems necessary to sustain high throughput and response rates even when burdened with heavy transaction pro-

cessing loads imposed by a large number of terminals. Also on the plus side, minis have accumulated a huge library of proven business software directed at many vertical markets.

Another impetus to the growth of the mini market is the increasing need to interconnect large numbers of personal computers in local-area networks. The multiuser requirements of most companies demand not only a large number of terminals, but also that these terminals have access to a common data base. This need is most appropriately filled today by a minicomputer system that

typically has a secure, centralized mass storage system and the power to share it among multiple users.

The rapidly declining cost and size of the minicomputer is another factor in its increasing market growth. Because of its ability to share a large data base and processing power among many users, the typical minicomputer system, on a per-user basis, often costs \$1,500 to \$2,500. As the multiuser demand grows, the per-user cost becomes the most important dollar figure. In addition, more and more minis are being introduced that meet the demands of the contemporary office.

The answer to the question, "Where are the new markets for minicomputers?" is "Anywhere cost-effective multiuser capability is required." It is interesting to note that while the mini began in the early '70s primarily as a single-user scientific calculation device, it has evolved into the principal tool of the small to medium-size business. As was stated before, the key to the minicomputer's importance in business is the requirement for large multikeyed data bases capable of delivering immediate-retrieval and updating to a series of professional and clerical workstations, which are all logically connected to the same applications functions.

Fastest Growing Mini Markets

Certain types of businesses have a need to access a central data base and, therefore, can be identified as the fastest growing mini markets. Some of these are new opportunities, while others are traditional customers whose requirements continue to increase.

One of the fastest growing markets for minicomputers is in the professional services area, primarily medical and dental applications in which multiple doctors' offices, clin-

(Continued on SR/36)

Company Needs Will Determine If Mini is Best

(Continued from SR/32)

one micro to another, but to keep the structural integrity of integrated systems on a micro correct is almost an impossibility.

The integrity of information is more easily controlled when it is not duplicated throughout systems. The mini encourages nonduplicated data through core data banks. When information is found to be invalid, it can be maintained in only one location, making it possible to correct it quickly and still control the integrity of the whole system.

If a business requires a mini, its information advantages over the micro include: multiple information access by users concurrently, growth capabilities of information storage and backup speed and control.

Boyd is a programmer/analyst for Falcon Crude Transport and Trading Co. in Abilene, Texas.

WE PUT OUR THIN-FILM
HEADS TOGETHER AND
CAME UP WITH A BETTER
STORAGE SYSTEM.



PCM COMMITMENT YOU CAN
COUNT ON FOR GENERATIONS

Actual size

We took innovative technologies and built the most advanced DASD systems now on the market—the Control Data 33800 and 33750. Like our thin-film heads—shown above in a head/arm assembly. Like four separate and independent, sealed Head/Disk Assemblies (HDAs): sealed for protection from computer room air; independent for improved maintainability. Dual access and dynamic path selection mean greater

throughput and better string availability. Like all our DASD systems, the 33800 and 33750 are fully compatible with IBM architecture. And they offer additional benefits like XA compatibility and floor space savings of up to 20%. The 33750 is even field upgradable to a 33800.

With the 33800 and the 33750, our PCM commitment pays off again. For more information, call 612/553-4311.

CD CONTROL DATA

Maintenance Needs, Service Pact Shape DP Cost

By Frank Fabiano

Special to CW†

The total cost of any data processing system does not consist only of the price of the equipment and software. Before purchasing any new or additional computer equipment, carefully examine your maintenance needs and the type of service contract most suited to your business needs.

There are three basic types of maintenance contracts available:

- **Time and materials billing.** This agreement is not strictly a contract; you pay for the service engineer's time on the service call and the materials used to make repairs. This type of arrangement can include a ceiling cost; for example, you may contract for a \$1,000 limit against which time and materials would be charged. This type of service is usually done at your place of business.

- **Return to depot.** The most economical of all service agreements, this contract requires you to bring the equipment to the engineer's shop for repair.

- **On-site.** The technician comes to the work place to repair the equipment, eliminating transportation time. An on-site service contract generally costs approximately 15% of the selling price of the equipment.

Each type of service agreement offers its own advantages and disadvantages, and these must be weighed before you select on the basis of price or overall efficiency.

Time and materials billing, for instance, would be suitable for any type of equipment if only one service call was required. This is rarely the case, however.

One-and-a-half service calls, which is the industry standard, place you at the break-even point for an annual service contract. You are taking a considerable risk in assuming your computer will not need repairs beyond this average — a risk that could be very costly.

Although on-site service is more expensive than return-to-depot, it is the quickest way to get the user back to doing his or her job. Also, analyzing problems in the environment where they occur is of inestimable value to the engineer, as well as to the user, in avoiding similar problems in the future.

How do you decide which service and maintenance agreement is right for your business? By examining the use of the equipment, its specific functions and the job it must perform, its importance in the overall operation of your business and the abilities of the computer operator.

For instance, you are the owner of an import-export company dealing in machinery parts. Your entire inventory, including parts numbers and prices, as well as purchase orders and invoices, are processed by computer. Obviously, the efficient operation of your equipment is essential to your business's profitability. You depend on your computer and simply cannot have it tied up in transportation and maintenance at the shop.

Also, this type of operation can re-

sult in very heavy equipment usage, increasing the possibility of downtime over the industry standard. An on-site service contract is clearly best for you.

Many service companies and manufacturers will conduct this type of business analysis before recommending a maintenance contract for your equipment. But what should you look for in any proposed maintenance contract?

- Built-in protection from price increases, either in the form of an extension to the agreement or a schedule of anticipated annual increases.

- The total number of hours the

contract covers; inquire about the approximate number of hours the service company anticipates for specific problems.

- The service company's guaranteed response time.

- Whether or not the service company will provide units on loan in the event a piece of equipment must, for any reason, be returned to the shop or replaced.

- If the contract covers routine, periodic preventive maintenance.

- Be certain the service company's engineers are factory-authorized; this is really the only credential you can check to be assured the techni-

cians are knowledgeable in servicing your product lines.

The final service you should look for in a maintenance agreement is a system for reporting service history. Dataflex Corp., for example, has a procedure which records service calls and the specific problems encountered by serial number.

By utilizing this or a similar problem-tracking system, your service company will be able to analyze your company's service history and determine factors which can affect the life of your computer equipment.

Fabiano is vice-president of sales for Dataflex, Cranford, N.J.

Radio Shack's TRS-80 Model 12 Makes Choosing a Microcomputer Easy!



- Two Built-In 1.25-Megabyte Disk Drives
- 12" High-Resolution Monitor
- Ideal for Business and Industry

80K 2-Disk
Model 12 **3999⁰⁰** 26-4005

Commercial Lease Available For Only \$140 Per Month
(Plus Applicable Use/Sales Tax)

A Multi-Purpose Computer. The TRS-80 Model 12 is a desktop computer that can save valuable "big machine" time in any data processing department. Develop your own programs with Model 12's BASIC interpreter and compiler, COBOL, FORTRAN and Assembler. Or train and evaluate your beginning programmers using ANSI '74 COBOL (without sort and report writer). You can even outfit Model 12 for 3270 or 3780 bisynchronous communications with IBM® and DEC®

mainframes. And with our wide selection of user-oriented software, Model 12 can relieve your mainframe from jobs like spreadsheet analysis, word processing, accounting, filing and more.

Learn About All Model 12's Possibilities. Get a personal demonstration at a nearby Radio Shack Computer Center or participating store or dealer. Ask about leasing, training and service, too.

Radio Shack COMPUTER CENTER

A DIVISION OF TANDY CORPORATION

Prices apply at participating Radio Shack stores and dealers. IBM is a registered trademark of International Business Machines Corp. DEC is a registered trademark of Digital Equipment Corp.

☐ Send me a free TRS-80 Computer Catalog

Mail To: Radio Shack, Dept. 84-A-542
300 One Tandy Center, Fort Worth, Texas 76102

NAME _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

TELEPHONE _____

Its Too Early to Ring Down the Curtain on Minis

(Continued from SR/34)

ic stations and functions are interconnected. Computers are used to maintain complete patient histories, appointment scheduling, accounting, inventory control and the processing of third-party insurance paperwork.

The formidable requirements of today's pharmacies are also being undertaken by multiuser minicomputer systems. Minis are used to orchestrate each patient's profile of medication history and drug interaction, an area of increasing concern in medicine. The same systems maintain control of the pharmacies' large inventories, distribution of certain types of controlled drugs, cross typing of drugs to pharmaceutical codes plus the processing of standard financial applications and all supporting paperwork required by state and federal governments.

Applications that have previously been accomplished by traditional batch processing mainframes more and more are being serviced by on-line minis. Small to medium-size hospitals and patient care facilities are using minis to handle huge amounts of federal and state paperwork as well as care processing, billing and history. The mini provides the power of the former mainframe plus the multiuser interaction necessary to reduce the mountain of paperwork.

Advertising Industry

Another new marketing opportunity for the multiuser mini is the advertising industry. Not only are systems used for typical business functions, such as financial services, planning, labor and materials tracking, but also for "creative" services such as postanalysis of advertising, market research and so on. Copy is handled through integrated word processing.

Some of the largest minicomputer systems are being developed for distribution firms in a wide variety of industries. What unites these companies is the need for instant access to up-to-the-minute data on an enormous inventory.

A typical example is a Point 4 Data Corp. customer who supplies alarm equipment nationwide. This company began with a simple three-user system and today, just two years later, interconnects 70 users in eight branch offices.

The focus of each new market is on cost savings and productivity enhancement

for such functions as reservations, check cashing, point-of-sale processing, direct mail, electronic mail, telemarketing, shop scheduling, loading and tracking and financial and inventory accounting.

Equally important as the improved productivity and profitability is the formal

systemization that the computer superimposes on what may have been haphazard, highly individualized activities.

Customers find that swift and consistent automation procedures facilitate swift and consistent customer service levels.

A sure thing in today's

fast-changing market is that minis will continue to grow in user capacity and market acceptance.

Tomorrow's minicomputer will support hundreds of workstations, many of which will be micro-based.

Today's new users are proving that minicomputers have the proven multiuser

file capabilities that both allow fast access to the data base and provide security and integrity in demanding environments.

The minicomputer is a tough act to follow and is getting tougher all the time.

Petri is director of new market development for Point 4 Data Corp.

NEW MATRIX PRINTER OUT PERFORMS ITSELF 3 TO 1.



H I G H P E R F O R M A N C E

*Increased Storage, User-Friendliness Cited***Micros Seen Benefiting Smaller Businesses Most**

By Aristotle Lekacos

Special to CW†

The fact that microcomputer systems have become remarkably affordable has sent many business people to their local computer stores in quest of easy, economical computerization. There are

many reasons why a small or moderate-size business of any sort can benefit from the installation of such a system.

The advent of multiuser systems, increased storage capacities, improvements in user-friendliness and better software have made micros

the computers of choice for more and more businesses every day.

Many businesses that wanted to computerize a few years ago, but needed more in the way of applications software than was available for micros, turned to mini-

computers. Some found them difficult for their employees to use, as well as expensive, especially with their largely customized software.

Many of these firms have since traded their old minis in for multiuser microcom-

puter systems, and many new users have gone directly to micros because they are so inexpensive and multifunctional. Applications that would have cost hundreds of thousands of dollars on a mainframe just a few years ago can now be packaged on a micro for well under \$50,000. At this cost, a system will often pay for itself within a year, if properly utilized.

Thanks to microprocessor technology, small to medium-size businesses may stand to achieve the greatest dollar-for-dollar benefit from investment in a computer system. This is due to the low cost of investing in a microcomputer and the power contained in these systems relative to their size and cost.

Faster Transition

Besides the basic cost of the machinery itself, a great portion of the financial benefit offered by a microcomputer lies in training. If the software is good and the documentation well written, the transition to a microcomputer is faster, easier and less costly than transition to a mini.

One California businessman using microcomputer software compared the costs with that of a popular mini-computer he had previously used. The mini, with software, had cost \$175,000; training costs amounted to \$35,000. His microcomputer and software cost \$30,000, with "virtually no training costs."

Although the hardware in micros is still relatively inexpensive, the storage capacities of today's hard disks have become considerable, as have the speeds with which the disk drives react to user requests. A system with eight terminals in use simultaneously can still respond to each user's request as quickly as if the user were the only one on the system.

Hardware is only one factor in the overall operational speed of a system. Software design, training and other factors each play an important role. But the simple addition of all those extra terminals makes it possible for a system to reach out and automate every department of a modest-size company.

The first microcomputers were not seen as very useful to businesses, being, for the most part, single-user systems with only very general accounting packages. Even as new packages were made available, the result was no-

(Continued on SR/38)

**INTRODUCING THE NEW DS220
MULTI-MODE MATRIX PRINTER**

In the beginning was the Datasouth DS180. A printer that *defined* high performance printing, with a balance of high technology design and mechanical simplicity. A high throughput printer that produced clean hardcopy under the most severe conditions.

Now there's the Datasouth DS220. A printer that raises those high performance standards and applies Datasouth technology to multiple printing tasks—all at one time.

The Datasouth DS220 redefines high performance for multimode printing the way the DS180 did for data quality printing.

For speed, the DS220 combines a 220 CPS print speed with servo-controlled logic seeking and high-speed tabbing over blank spaces. This allows the DS220 to zip instantly from one printable character to the next. In side-by-side tests of real-task performance—not just spec-sheet comparisons—the DS220 outperforms its rivals time after time.

For correspondence, the DS220 uses its 40 CPS bi-directional NLQ mode to form characters with the precision and clarity you would expect from a word processing printer.

And for graphics, the DS220 adds high performance artistry to popular microcomputer applications programs through high-resolution, dot-addressable output. Sharp new details emerge from business charts and graphs, and from engineering drawings.

The sum is even more than three printers in one. The DS220 offers a total of eleven different pitches and fonts along with seven international character sets. Plus non-volatile space for up to 64 do-it-yourself characters for downloading from the host computer.

And those are just the printing capabilities. In other respects, the DS220 outperforms not just itself but virtually every other printer on the market. Its front panel programming sets new standards in user friendly printer ergonomics. Its four digit LED display and push button panel allow programming of over fifty features, with a minimum of fuss and confusion. Those features include a variety of interface and communications selections that allow compatibility with a wide range of mini and microcomputers. And the DS220 handles six part forms with its adjustable tractor feed, as well as cut sheets and letterhead with its friction feed.

Best of all, the DS220 advances all the engineering, design and mechanical virtues established by its forerunner, the DS180. In the Datasouth tradition, the DS220 is made to run virtually nonstop in a wide variety of applications.

Test drive three high performance printers in one—the multimode DS220.

Call for details and the name of your nearest Datasouth sales/service distributor.

HIGH

PERFORMANCE

HIGH

PERFORMANCE

**datasouth**

M A T R I X P R I N T E R S

Available nationwide through our network of sales/service distributors.
Datasouth Computer Corporation • Box 240947 • Charlotte, NC 28224
704/523-8500 • Telex 6843018 DASOU UW

Simulated output shown. Call or write to Datasouth for samples of actual output.

Smaller Businesses Gaining Most From Micros

(Continued from SR/37)

where near complete computerization because the packages were not often integrated. Data relevant to several separate files had to be entered separately.

Because some software companies have put the extra time and research into the development of integrated software packages, micro users can now realize much more of what their systems are theoretically capable of providing. Not only is there a program for each business function, but they can be fully integrated so that all files are completely up to date on information relevant to them, no matter where the data was placed. This brings the user that much closer to the system's full time-saving potential.

Industry-Tailored Aids

One of the most important improvements in microcomputers, however, came with the development of vertical-market or industry-tailored software. Standard horizontal software was designed to handle a function or functions that might be common to many different businesses, such as payroll or accounts receivable.

With a number of these on a system, the business might be completely computerized. But even then, the various packages would probably not be integrated, and they might need modifications in order for the various functions to be performed the way they are in a given business.

Vertical-market software, on the other hand, was designed to automate all the business procedures of any one type of business, in the way the procedures are performed within that industry. This makes vertical software packages more extensive and somewhat more costly than the others, but what they provide is essentially custom-tailored software, off the shelf.

A multiuser microcomputer system with user-friendly software that provides integrated programs enables every department of a business to improve its operations.

Part of the reason microcomputers are so appropriate for small businesses is because they are intended for the nontechnical, non-DP employee. A wholesaler with about 25 employees can make the system available to at least half of them, because training with a properly designed system can be quite easy.

User-friendly software is

being designed more and more with the end user in mind, especially when the software designer has spent some time with such end users, learning how they conduct their businesses and what kinds of prompts make sense to them. When bookkeepers are as comfortable with the computer as they

are with their ledger books, productivity increases significantly. Of course, one should sample the merchandise to make sure one's employees will, in fact, relate well to it.

Sometimes the results are seen indirectly. One manufacturer who used his system's word processing func-

tion to improve correspondence, including sending out monthly statements (which he had not been able to do previously), reported that receivables had been sped up by 14 days.

Planning for and dealing successfully with the growth of a business is an area where a micro can be invaluable to

a small business. The organizational and computational power of a computer makes the growth process just another set of calculations for many business people, enabling their businesses to grow that much faster.

Lekacos is president of Trac Line Software, Inc. in Hicksville, N.Y.

SIEMENS

Built for Speed.



The silent PT-88 jet printer... from Siemens.

Mini Strikes Back With Compact Packaging

By Richard Dohrmann
And Michael Liccardo
Special to CW†

For the minicomputer, the OEM has been both a blessing and a curse. Wide OEM acceptance has, of course, contributed to a rich base of applications software. But the lack of more direct channels of distribution has tend-

ed to limit the minicomputer market unnecessarily.

As a result, microcomputers, particularly the larger multiuser systems dubbed "supermicros," have gotten a foothold into business installations. But while supermicros may have gained the lion's share of the attention, for many installations, the

embracing of micros to the exclusion of minis is similar to tossing the baby out with the bathwater.

Minicomputer software, in particular, is more sophisticated and cost-effective than its microcomputer counterpart. Moreover, the same advances that have made the microcomputer a

bargain apply to minis as well.

More compact packaging, lower production costs and less expensive media drives are moving the price of systems downward. Far from heading toward extinction, the minicomputer is striking back.

Consider, for example,

Digital Equipment Corp.'s PDP-11, the most widely used minicomputer in the world. Although many of the PDP-11's early applications were in technical installations — research labs, process-control environments, universities — DEC has also developed a following in the commercial market.

OEM Dominance

This domain has been dominated almost exclusively by the OEM, who configures the machine individually for his customer, adds the appropriate software (which is generally proprietary) and sells it on a turnkey basis.

The OEM's strong suit is customization. But the process is expensive; configuring computers in a unique fashion for each customer increases overhead at every stage.

So, while the OEM seeks to lower prices through lower hardware and software development costs, minicomputer manufacturers and software publishers are pursuing a parallel path — looking for more direct channels of distribution by lowering the costs of their systems and reducing the amount of in-house or outside expertise required to keep them running.

A clear trend at the hardware end is toward more compact minicomputer packaging that is able to compete with high-end micros for price and features, yet maintain compatibility with the large base of minicomputer software.

The size reduction permits a smaller power supply that generates less heat. As a result, these systems can run unobtrusively from a desktop, instead of being housed in a dedicated, air-conditioned room.

The PDP-11 architecture is a natural for this type of repackaging. In the commercial market, it is often sold as a time-sharing system supporting from three to 16 users, and it supports a rich library of application software.

The recently unveiled micro PDP-11 from DEC reveals some of the potential for such a mini. The demand for the product has created such a backlog that the company cannot manufacture enough of them.

These systems are not only comparable with an installation's existing PDP-11s, they can also be networked within a PDP-11 or DEC VAX-11 environment. In

(Continued on SR/40)

In the highly competitive race for advanced matrix printing technology, one company has moved ahead of the pack.

Siemens all new PT-88 matrix printer offers the fast, dependable performance you require...at a very affordable price. Gliding along at 150 cps bi-directionally, the PT-88 provides exceptional print quality in 8 resident user-selectable character sets on low cost, margin-perforated fanfold, single-sheet, or roll paper.

This compact, precision-engineered printer also features our ultra-silent "drop-on-demand" jet printing system that ensures consistent, high quality character formation—at a quiet, ear-pleasing operating sound level of less than 50 dBA. Its outstanding reliability is reflected in the printing head, which is rated in excess of 10 billion characters. The PT-88 also offers full graphics, downloadable character sets, selectable character sizes, a minimum of moving parts, and self-test capability.

In short, why settle for one of the industry's "also rans" when you can choose a company that is leading the way. For complete information contact:
Siemens Communication Systems, Inc.
Anaheim, CA (714) 991-9700
Boca Raton, FL (305) 994-8700
Atlanta, GA (404) 441-0882
Chicago, IL (312) 671-2810
Boston, MA (617) 935-2234
Teaneck, NJ (201) 321-7840
New York, NY (212) 753-1325

Lower Costs Help Put Mini Back in Driver's Seat

(Continued from SR/39)

contrast to the purchase of a supermicro, where the installation enters at the high end of the technology, a small minicomputer represents the low end of the minicomputer world, affording virtually unlimited expansion.

The large-scale integration processor, although proprietary to DEC, represents an island of stability when compared with the microcomputer realm. The only micro-based CPU to deliver comparable performance has been the Motorola, Inc. 68000.

Yet Unix, the prime operating system for this processor, is represented by so many proprietary versions that there really is no standard in that marketplace. This is also true of C compilers, making program development difficult for more than one machine.

Operating System

Another advantage supermicros have had over minicomputers has been in the operating system. Minicomputer operating systems were designed on the assumption that either an in-house expert or outside consultant would oversee their use. Consequently, a system generation can take several hours to complete yet must be done each time a terminal or other peripheral is added.

Clearly, what is needed is a minicomputer operating system that is easier to use and reconfigure, yet maintains its power.

Minicomputer operating systems such as DEC's RT-11 have been written with large systems in mind, rather than migrating upward. MP/M 86, for example, Digital Research, Inc.'s 16-bit, multiuser version of its CP/M operating system, has roots in the small 8-bit arena. The more ubiquitous Microsoft, Inc. MS-DOS, found on the IBM Personal Computer and its look-alikes, doesn't even have a multiuser implementation.

Unlike their microcomputer counterparts, microcomputer operating systems provide data and directory caching, which automatically keeps frequently used file and directory entries in memory, rather than constantly having to fetch them from disk.

Perhaps the greatest strength of minicomputers is their broad base of application software. DEC OEMs have been refining their packages for years, and there is a wealth of them.

In the microcomputer arena, the old standbys like Micropro International Corp.'s Wordstar and Visicorp's Visicalc are certainly bug-free, but they were designed to function within the confined resources of an 8-bit architecture.

When transported to larger systems, they still operate

with the same limitations.

This is less true with newer software, of course, but often the packages are so new that early users inevitably act as the final beta site for testing. This problem is accentuated in vertical marketplaces, where microcomputer installations often develop and market software

after not finding any for their particular industry. But a part-time software house is hardly in the best position to give full-time support to its users.

The new microcomputer market, rather than sinking minicomputers, will help them thrive. As users demand more and more of their

systems, they will eventually see the light and migrate upward. They will, after all, be in the best of company.

Dohrmann is vice-president of marketing at S&H Computer Systems, Inc. in Nashville, Tenn. Liccardo is vice-president of operations for Scientific Micro Systems, Inc. in Mountain View, Calif.

PRESENTING LEAR SIEGLER'S AMERICAN DREAM MACHINES: THREE NEW HIGH TOUCH™ TERMINALS.



Have you noticed that the more high technology we put into the workplace, the more human touches the workers put in? There's a real need to soften the interface between people and high technology.

That's why we designed our new High Touch™ terminals to work together with biology, not just with technology.

Our new generation of High Touch terminals brings an elegant new touch to our American

Dream Machine (ADM™) tradition. The family features three new ergonomic terminals designed to meet the needs of OEMs and end users alike: The ADM 11, ADM 12 and ADM 24E.

There is more to ergonomics than simply tacking on a few faddish features as an afterthought. That's why we put our thinking in up front. And came up with a whole new way for terminals to relate to humans.

No aspect of terminal design escaped our deepest consideration. Or reconsideration. Dozens of little touches add up to the convenience and comfort of High Touch. For example, we put the power "on/off" switch and contrast control knob in front where they're easy to reach.

The monitor not only tilts and swivels, it stops positively in almost any position.

The clean, crisp display features a large character matrix on an easy-to-read green or amber non-glare screen—made even easier to read by the hooded bezel. Screens are available in 12" or 14" sizes.

Our uncluttered keyboard, with its logical separations between key groupings, improves your efficiency. The low-profile, DIN-standard keyboard is not only tapered, its angle of tilt is easily adjusted for maximum operator comfort.

Low profile DIN-standard keyboard with adjustable tilt.

The Selectric® layout with its sculptured keys makes data entry easy and efficient. And we placed the *control* and *escape* keys close to the alphanumeric keys, where people just naturally expect to find them.

The ADM 11 is a High Touch conversational terminal that accepts data continuously at 19.2 kilobauds. It features separate cursor control keys logically arranged in a cross for ease of use. Four modes are provided for the printer interface: page print



6' coiled cable lets you put the keyboard anywhere.

Sales & Service: Boston (617) 456-8228 • Chicago (312) 279-7710 • Houston (713) 780-9440 • Los Angeles (714) 774-1010, Ext. 219 • Philadelphia (215) 245-4080 • San Francisco (415) 828-6941 • England (04867) 80666 • From the states of CT, DE, MA, MD, NJ, NY, RI, VA and WV (800) 523-5253. OEM Sales: Chicago (312) 279-5350 • Houston (713) 780-2585 • Los Angeles (714) 774-1010, Ext. 583 • New York (516) 549-6941 • San Francisco (415) 828-6941 • England (04867) 80666. Selectric® is a trademark of IBM. High Touch™ and Express Depot™ are trademarks of Lear Siegler, Inc.

Formulating a Micro Policy for Your Company

By G.M.K. Hughes

Special to CW†

Consider this scenario: On a pleasant Sunday afternoon, an Izod-shirt-clad executive who has exhausted the golf and Sunday *New York Times* possibilities, turns to his micro. At the touch of a few buttons, he can display, in simple, multicolored pie

charts, the future of civilization as we know it, under any set of assumptions.

Why would these corporate Aladdin's lamps need to be the subject of any policy except, perhaps, that they should not be ordered in less than gross lots? Answer: Because many otherwise sensible people apparently be-

'The key issues of any micro policy are: What are the appropriate uses of micros?; who approves their acquisition?; and what are the roles of users and systems professionals?'

lieve what they think they see in the ads and cannot wait to enter the informa-

tional Nirvana.

Thus, the information vice-president begins gather-

ing data on which to base a policy.

The key issues of any micro policy are: What are the appropriate uses of micros?; who approves their acquisition?; and what are the roles of users and systems professionals? In broad strokes, appropriate uses are:

- As stand-alone devices for spreadsheets.

- As dumb terminals to mainframes.

- As adjuncts to the mainframe through downloading data for subsequent use by micro software.

- As word processors.

- As graphics drivers.

The policy must also point out to management what the vendors do not — what constitutes inappropriate use. For a big corporation, inappropriate uses include:

- Constructing large data bases.

- Programming by non-systems professionals in detailed languages such as Basic, Cobol and Fortran.

- Transaction processing without the participation of systems professionals.

Management also must be told that the major cost of micros is not the initial \$3,000 to \$12,000 for hardware plus some software, but the continuing cost of collecting and entering data and of freelance programmers if non-purchased software is used.

Before writing this policy, I looked around to see what others had written. After checking with some DP groups, I was horrified to see request forms that contained such questions as:

- Which "low-level" languages are to be used?

- By application, how many transactions and how many hours is the micro to be used per week?

- What percentage of prime shift is anticipated for each kind of activity?

These questions are 20 years out of date. So far, the policy at the company for which I work is simple: We will lease anybody a micro if he can give a coherent account of how he intends to use it. The key, of course, is the definition of coherent account. To gain that, we need but ask five questions. They are:

- What are you trying to do?

- How do you now do it, if at all?

- Why do you want to use a micro to help you, as opposed to any other alternative?

- How do you propose to get the requisite data from wherever it now exists onto a

(Continued on SR/42)

ADM 11 ADM 12 ADM 24E

Programmable Function Keys	4 (Shiftable to 8)	16 (Shiftable to 32)	16 (Shiftable to 32)
Additional Function Keys	Optional	Standard	Standard
Automatic Key Legends on	From Host	From Host	Standard Non-Volatile
Display Memory	1	2	2 or 4
Text Configurations	24 lines by 80 characters	(2) 24x80 or (1) 48x80 or (1) 24x158	User-Definable up to 96x80
Scrolling	Standard Scrolling	Smooth, Jump or Horizontal Scrolling	Smooth or Jump Scroll
Conversation Mode	Conversation Mode	Conversation or Block Mode	Conversation or Block Mode
Editing	Limited	Full Editing & Protected Fields	Full Editing & Protected Fields
Visual Attributes:			
Cursor Intensity, Blink	3 Embedded	5 Embedded or Non-Embedded, plus Full Screen Reverse Video	6 Embedded or Non-Embedded, plus Full Screen Reverse Video and Highlight
Cursor Position	1 Non-Embedded		
Also features ADM 24E			
ADM Flexibility	Modifiable Set-Up Characteristics	Modifiable Set-Up Characteristics & Personality	Modifiable Set-Up Characteristics. Add to Program in ROM or Down-Line Load in RAM (56K ROM or RAM. Plus up to 22K Display Available) Room for add'l Logic Boards.

more computer-based systems than any other.

When you buy Lear Siegler, you're buying proven quality and reliability, backed by the broadest network of full service centers anywhere. That means you can get walk-in Express Depot™



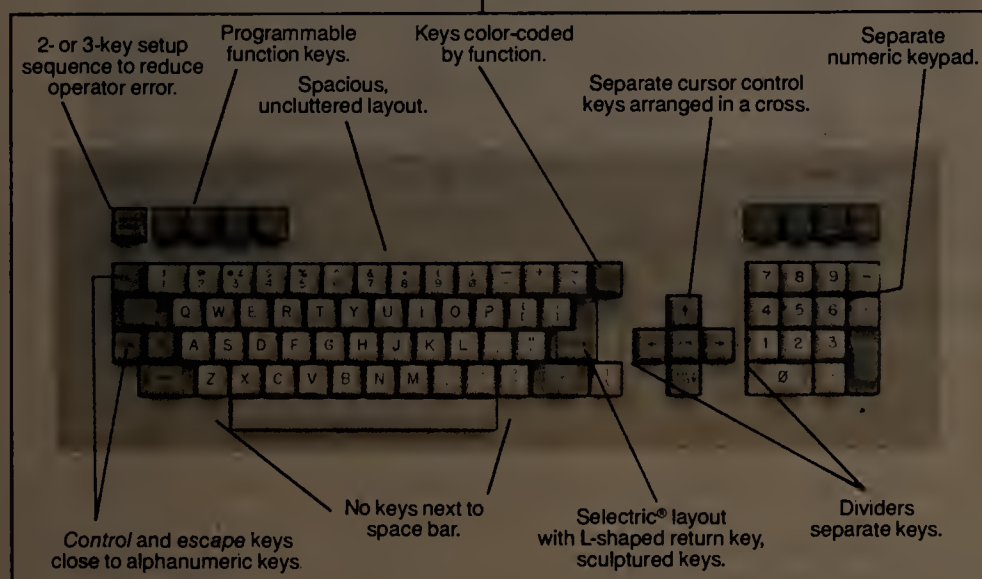
Monitor tilts and swivels to almost any position. Available with 12 or 14 inch screen.

service, on-site service and extended warranty service in 3,000 cities nationwide.

Lear Siegler High Touch terminals are made in America—designed, engineered, manufactured and shipped from Anaheim, California to provide you with the best local support.

And that's just one more reason they're called the American Dream Machines.

When it comes to terminal technology, we're the historic leader with the largest installed base. Our terminals are used in



LEAR SIEGLER, INC.
DATA PRODUCTS DIVISION

901 East Ball Road, Anaheim, CA 92805 • 714-774-1010

line print, transparent print, and display and print. There are four programmable function keys (shiftable to eight). And two levels of setup mode to reduce errors while still giving the operator maximum flexibility.

For a High Touch terminal with editing and more, choose the ADM 12. It features five non-embedded attributes. Embedded mode can also be selected for existing applications. And 16 programmable non-volatile function keys (shiftable to 32). The display can be configured as two 24 x 80 character pages, or one 48 x 80 page, or one 24 x 158 page. The terminal runs in either conversational or block mode.

Or choose our top-of-the-line ADM 24E which features a moveable 24-line window you can use to look at 48 (or 96) lines of memory. The ADM 24E also offers plenty of additional space for OEMs, with up to 56K ROM or RAM available for add-on programs. Plus up to 22k display RAM.

EVERYBODY MAKES TERMINALS. ONLY WE MAKE LEAR SIEGLERS.

Call Lear Siegler at 800/532-7373 for an authorized distributor near you: Advanced Technology • Consolidated Data Terminals • Continental Resources • The Datastore • Data Systems Marketing • David Jamison Carlyle, Inc. • Gentry Associates • Hall Mark Electronics • M/A-COM Alantus, Inc. • Marva Data Services • M.T.I. • National Computer Communications • Pioneer (Standard, Harvey, Gaithersburg) • 2M Corp. • Wyle Electronics • Kierulff Electronics. Selectric® is a trademark of IBM. ADM, High Touch™ and Express Depot™ are trademarks of Lear Siegler, Inc.



Systems Programmer at U.S. Steel's Lorain Works with Honeywell, Inc.'s Page Processing System.

Steel Works Turn With Help Of Page Processing System

LORAIN, Ohio — Steel and related products are made here 24 hours a day, seven days a week, at U.S. Steel Corp.'s Lorain Works, located about 30 miles west of Cleveland. Reporting the mill's activity to management every day by 8 a.m. is a formidable task, too, one that a page processing system has handled since July 1982.

Lorain Works operates three daily shifts, each one requiring more than 100 reports — as many as 60,000 pages in a 24-hour period — to keep management up to date on inventory, production, payroll and other

accounting statistics.

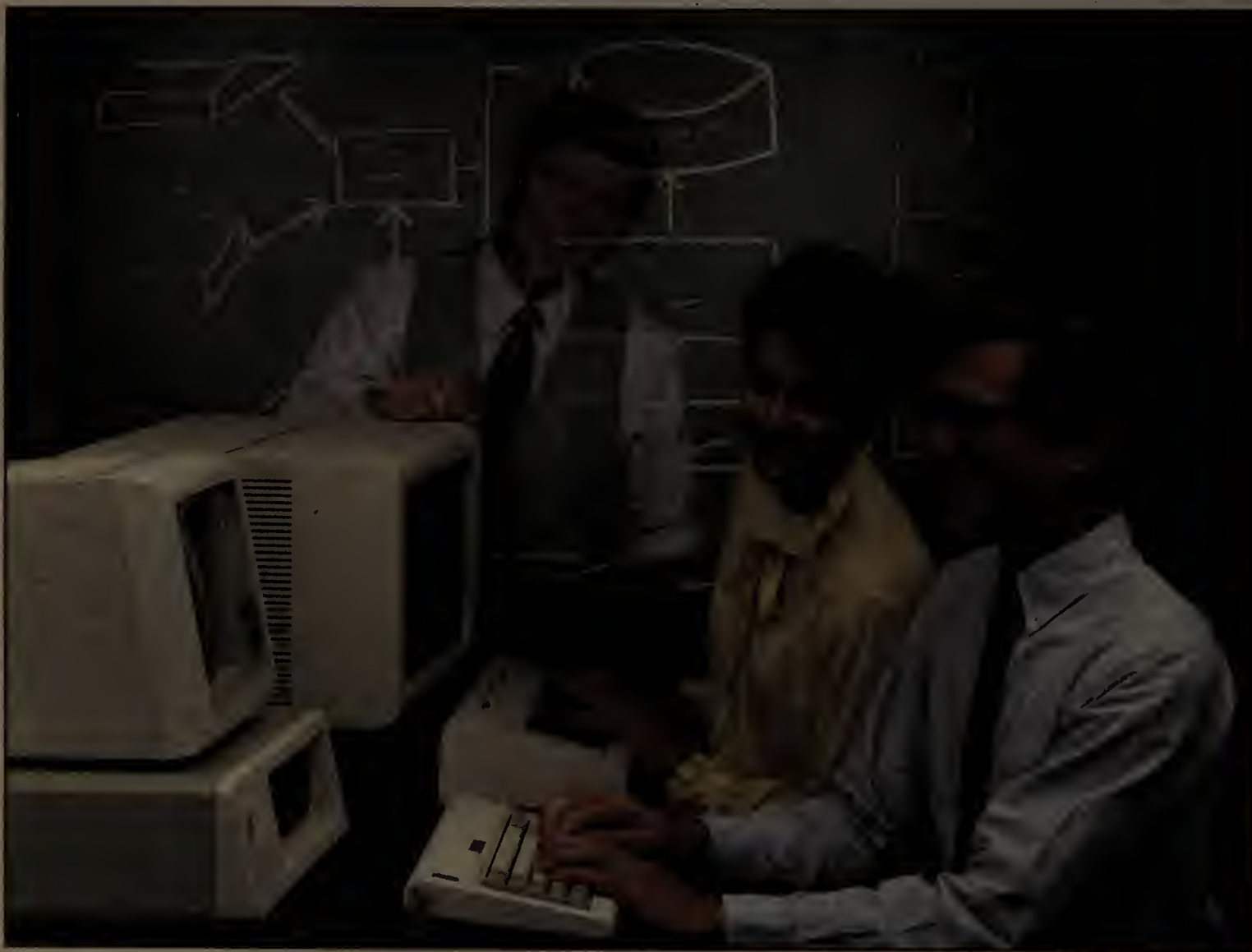
Each report consists of multiple pages and works from a sophisticated U.S. Steel distribution list software program so that reports are delivered early in each day's first shift.

"Our two mainframe computers used to have two impact printers for all that output," said Ray Pasciak, general supervisor for data processing at Lorain Works. "The impact printers did about 1,200 lines/min — not bad for the technology involved, but not nearly fast enough to meet our daily report distribution deadlines consistently."

Pasciak conducted a three-week analysis of paper usage with the im-

(Continued on SR/46)

SCHOLAR/TEACH 3[®] makes every terminal a virtual teacher.



We know.

At Boeing Computer Services, we know the importance of good teachers. But even good teachers can only be in one place at a time.

After years of experience with both classroom training and computerized learning, we have developed a unique software product that lets you deliver your best teaching. On request. Repeatedly. No student travel required. It's called SCHOLAR/TEACH 3, and it can train 3,500 students a week.

Our training background with many different kinds of employees helped us create flexible authoring and presentation software to support any number of subjects. From making reservations to handling insurance claims to creating COBOL programs.

Furthermore, SCHOLAR/TEACH 3 is designed to fit your equipment. You can author or present your training sessions on your IBM or compatible mainframe. Or IBM PCs. Or use our MAINSTREAM[®] teleprocessing network.

And, because SCHOLAR/TEACH 3 was designed by experts in both training and computing, we can meet

your special training needs.

We've trained more than 500,000 employees both within The Boeing Company and other major corporations throughout the world. Now we'd like to share what we know with you.

Send for your FREE copy of *Ten Things You Should Know About CBI*.

Just write Boeing Computer Services, Education & Training Division, P.O. Box 24346, M.S. 9A-90-8B, Seattle, WA 98124. Or call us today toll-free at 800-342-7700. Discover the lesson we've learned: behind all good CBI is the spirit of a good instructor.

BOEING COMPUTER SERVICES

A Division of
The
Boeing Company

©SCHOLAR/TEACH 3 and ©MAINSTREAM are registered service-marks of The Boeing Company.

Planning A Micro Policy For Your Firm

(Continued from SR/41)

floppy disk?

- What software do you intend to use, and where will you go when you need help?

If a requestor can get through that small catechism, he probably has addressed most of the right issues. With regard to roles, it's the job of systems professionals to set policy for the use of micros, to select and provide the hardware and software and to train and assist in using them.

It is also their job to maintain the data base. We want one set of data; we want it right; we want it up to date; and we don't want it inadvertently or maliciously altered.

As for end users, it is their job to define their problems and at least propose solutions that involve the micro. Beyond stand-alone spreadsheet analyses, end users are to have the facility to query and analyze their data bases, without continual assistance.

We want to move into an era where they don't call up someone on the systems staff and request that a report that is now 7 inches by 5 inches be changed to 5 inches by 7 inches. They should be given the tools to do that, and much more, themselves.

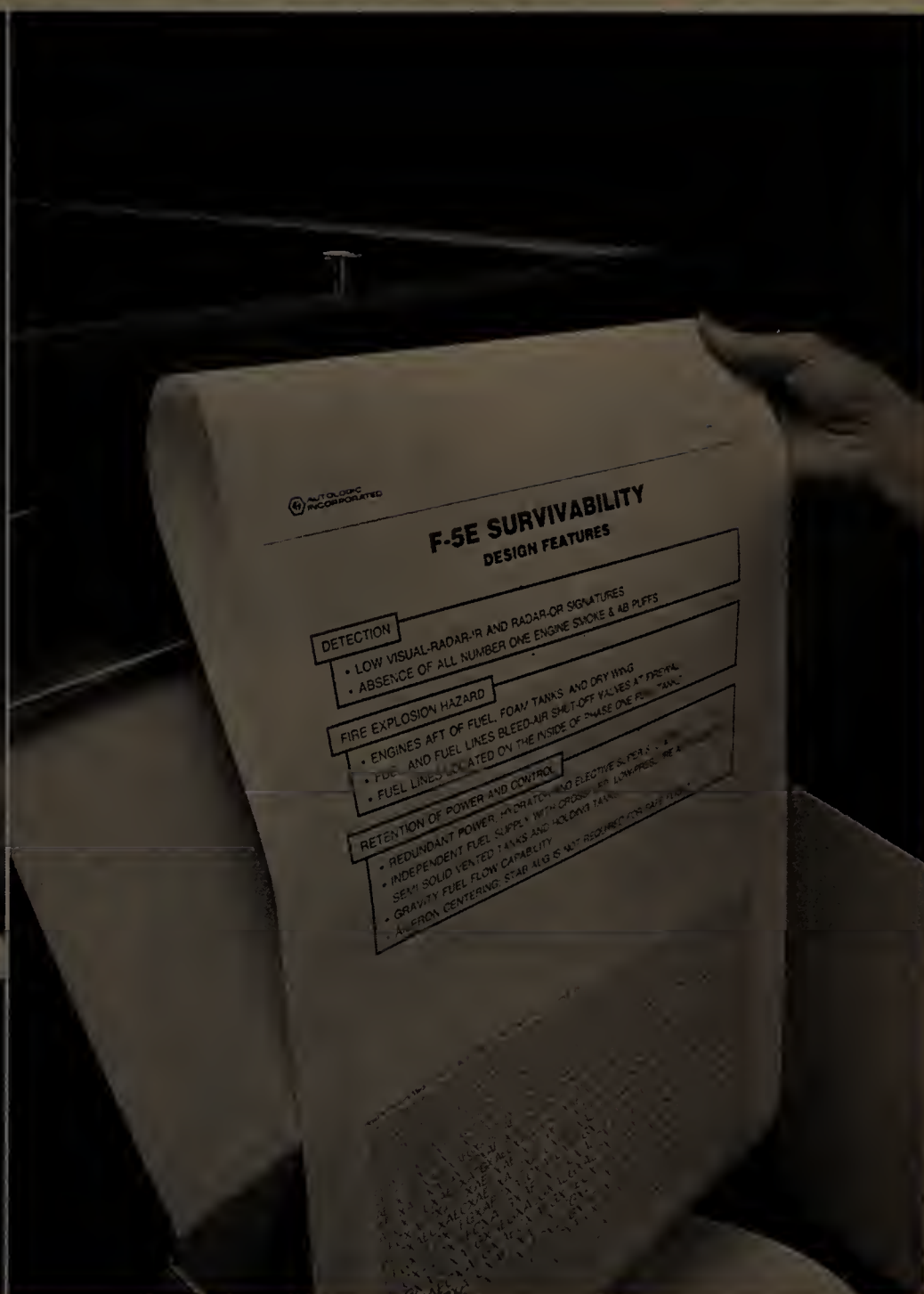
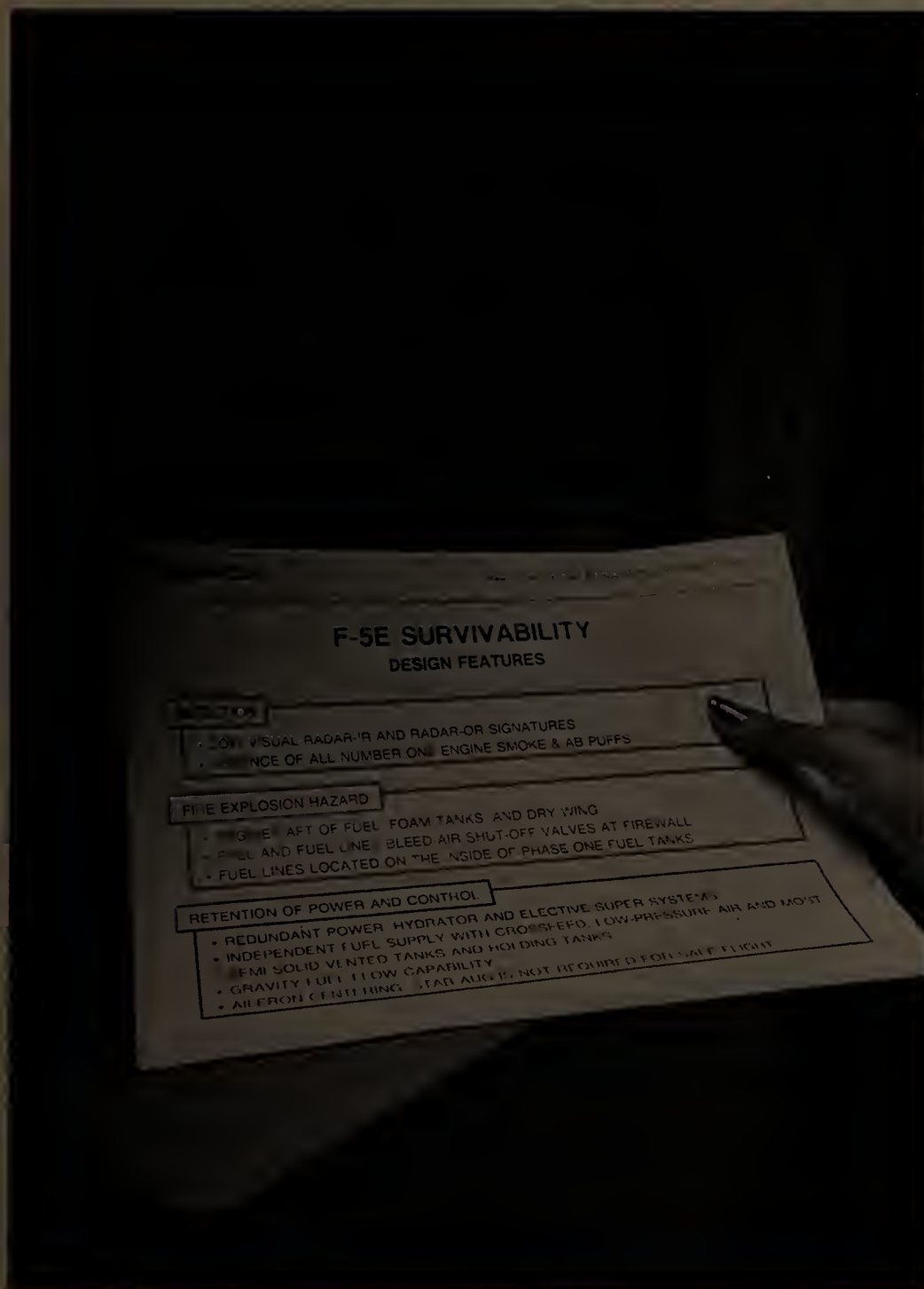
In summary, our policy on micros is predicated on their being a part of an overall plan for processing information.

Managers will not settle for anything less than facile access to the data they now receive. As we pass through the most turbulent part of the introduction of microcomputer technology, we can at least get from one plateau to the next if we:

- Define appropriate use.
- Decide if a specific request has been subject to some simple tests of reasonableness.

- Point out the areas in which executives and managers are being significantly misled by vendors, either through omission or commission.

Hughes is vice-president for systems and communications at Pfizer Pharmaceuticals, Inc. in New York City.



**Now you can
have a copy**

**Before you have
the original.**

It looks like it came out of your typesetter. Except it's on plain paper, not on expensive film or repro stock. In seconds, Autologic's APS-55 Bit Blaster™ makes as many inexpensive proofs as you want, without time consuming film processing.

The APS-55 Bit Blaster, a page image processor with laser printer, will cut your consumable cost significantly. Before you produce typeset originals, Autologic's

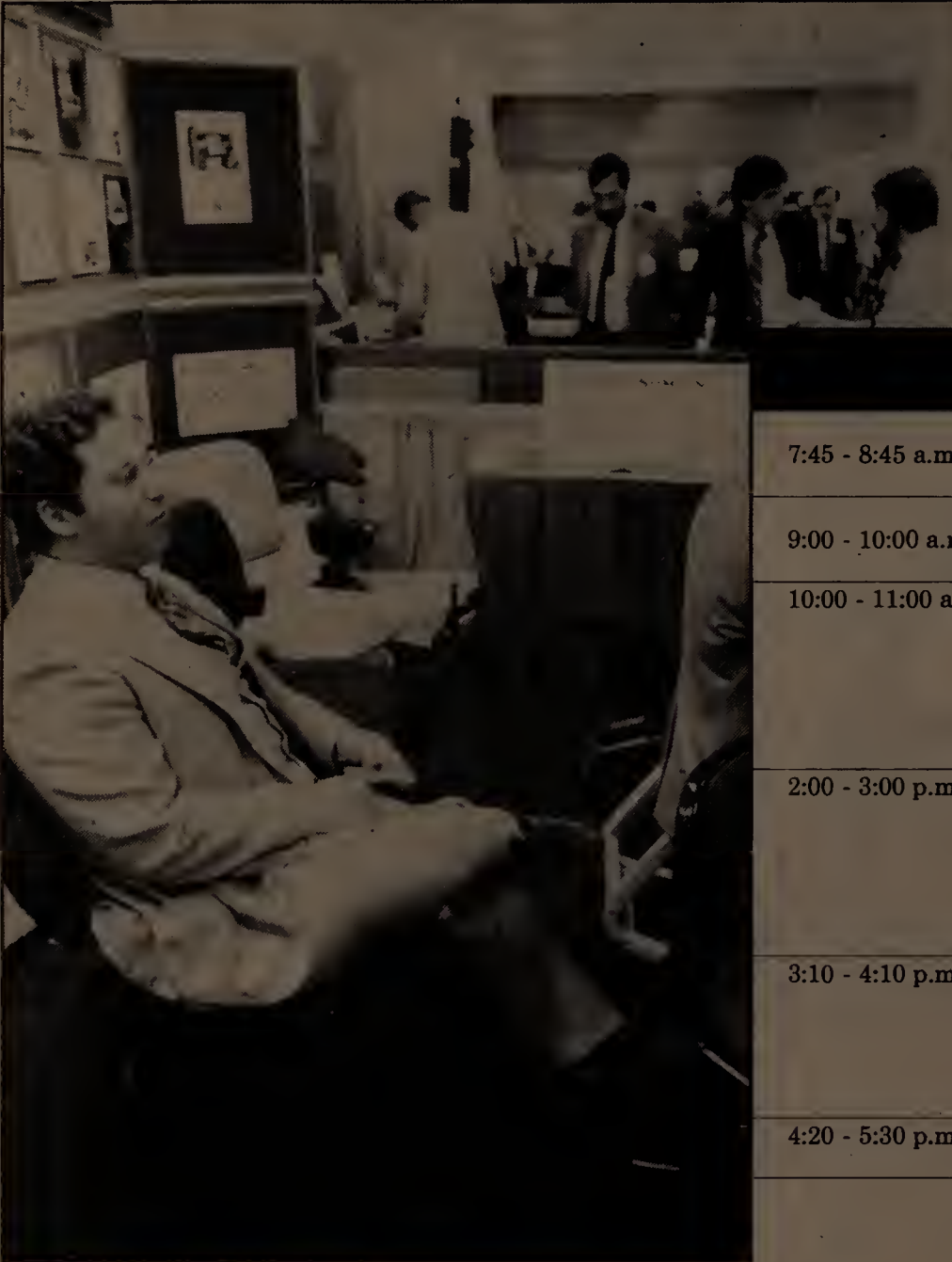
APS-55 Bit Blaster will give you proofs which are an exact duplicate of your typeset output. These fully composed pages show the actual fonts, logos and line art graphics to be used.

The APS-55 Bit Blaster is offered in two models, a dependent model which is resident in your APS-Micro 5 typesetter, and an independent model which can be used with either the APS-5 or APS-Micro 5 typesetter. The APS-55 Bit Blaster's telecommunications capabilities even allow you to set up remote proofing.

For more information, contact Autologic, Marketing Department, 1050 Rancho Conejo Blvd., Newbury Park, CA 91320 (805) 498-9611.

APS-55 Bit Blaster. Plain paper proofing by Autologic®

The Executive Microcomputer Conference and Exposition is coming to The Long Beach Convention Center on October 5-7.



The Conference Program

The computer show designed with you in mind! At the EMCE Conference Program you can learn in three days what could take three months.

Whether you're a DP/MIS Manager, a novice business computer user, vendor or entrepreneur, the EMCE Conference program will provide you with the information you need to make the most prudent and cost-effective software and hardware decisions for your needs.

The EMCE Conference Agenda, October 5-7 1983

THURSDAY, OCTOBER 6, 1983

7:45 - 8:45 a.m.	EYE OPENER: The Personal Computer in Communications Dr. Larry Magid, Executive Vice President, Know How, Inc.
9:00 - 10:00 a.m.	KEYNOTE: The Micro/PC Industry: IBM Domination & Future Directions Adam Osborne, Chairman of the Board, Osborne Computer Corp.
10:00 - 11:00 a.m.	The Executive/Professional Workstation John Crudele, Sr. Manager, Management Information Consulting, Arthur Andersen & Co. Software for Engineering Users Aki Runchal, President, Analytic and Computational Research, Inc. Channels of Distribution for Microcomputers Jim Finke, President, Internetwork, Inc.
2:00 - 3:00 p.m.	Spreadsheet Applications Laurence Press, President, Small Systems Group The Micro-Mainframe Connection Dick Andersen, Director, AM/MS, Charles Bornheim, Principal, AM/MS; Marc Cummings, Senior Consultant, Mini/Micro Technology, Bank of America. Packaging & Documenting Software Howard Zack, Marketing Communications Manager, VisiCorp
3:10 - 4:10 p.m.	The Future of Business Graphics Dr. Irwin Jarrett, Chairman and Founder, Fingraph Corp. The Engineering/Technical Workstation Glenn Stewart, Industry Marketing Manager, WICAT Systems The Personal Computer After Market To be announced
4:20 - 5:30 p.m.	Micros and the Changing Role of MIS Dr. Michael Hammer, President, Hammer & Co., Inc.

FRIDAY, OCTOBER 7, 1983

7:45 - 8:45 a.m.	EYE OPENER: Information Utilities for Personal Computing Fran Spigai, President, Data Base Services.
9:00 - 10:00 a.m.	KEYNOTE: The Fifth Generation Workstation & Artificial Intelligence Pamela McCorduck, co-author, "The Fifth Generation: Artificial Intelligence and Japan's Computer Challenge"
10:00 - 11:00 a.m.	Word Processing for Micros: The Next Step John Murphy, Vice President, Advanced Office Concepts Corp. Networking Microcomputers in the Corporate Environment Arnold M. Roberts, Consultant, ADC Associates Delivering Good Training and Support to the Corporate User Karen Orton, Vice President, National Training Systems
2:00 - 3:00 p.m.	The Information Resource Center Tom Kosnik, Researcher, Stanford Business School, William G. Haven, Independent Computer Consultant Portable Computers for Professionals Doug Mosher, Division Manager, Sybex, Inc. How to Raise Venture Capital Moderator: Melody Johnson, Securities Analyst, Cable, Howse & Ragen Panelists: Tom Cable, Partner, Cable, Howse & Cozadd
3:10 - 4:10 p.m.	Defining Integrated Software Moderator: Gordon Eubanks, Vice President, Commercial Systems Division, Digital Research, Inc. Panelists: Fred Gibbons, President, Software Publishing; Kurt Lynn, Product Marketing Manager, VisiCorp; Jeanne Mowlds, Quarterdeck Office Systems DBMS on Microcomputers Scott Kuklin, Executive Vice President, Helix Corp. Selling to the Corporate Account: Problems & Pitfalls William H. Luden, President, ComputerEase
4:20 - 5:30 p.m.	The Role of Microcomputers in Business Moderator: Edwin H. Shepard, Product Manager, The Software Products Division, Alexander Grant & Co. Panelists: Richard L. Willmarth, Manager, Office Systems, Storage Technology Corporation; Marc Cummings, Senior Consultant, Mini/Micro Technology, Bank of America.





**Special No-Wait tours of the
“Spruce Goose” — FREE**

EMCE has arranged for after-hours tours of the world’s largest airplane, Howard Hughes’ famed “Spruce Goose.” Tours will be held Wednesday and Thursday, October 5 & 6 from 6:00 - 8:00 PM. You can pick up your free ticket from any exhibitor on the show floor.

Win a Personal Computer

Here’s your chance to win the MORROW MICRO DECISION (MD3), the complete desktop system for the small businessman and professional. Just go to the InfoWorld exhibit booth and fill out a ticket. You may be the lucky winner.

**PLUS you get the the EMCE
Exhibition**

An exhibit floor full of products and services for serious micro users. And exhibitors who are anxious to help you find the answers to your business problems.

EMCE Long Beach is sponsored by CW Communications/Inc., publishers of *Computerworld*, *InfoWorld*, *ISO WORLD* and *PC World* and is the largest and most respected publisher of computer-related newspapers and magazines in the world.

 EMCE™
**Executive Microcomputer
Conference & Exposition**

FOUR “IN DEPTH” TUTORIALS
Wednesday, October 5 from 9:00 a.m. - 5:30 p.m.

EMCE’s “In Depth” Tutorials are all day seminars for managers who need a comprehensive understanding of one of the topics outlined below. All tutorials include two coffee breaks and a complete course notebook with reference materials. The tutorials will be held at the R.M.S. Queen Mary, Long Beach, CA.

How to Select a Business/Personal Computer

- How to Select the Features You Need
- Determining What Size Computer You Really Need
- What to Look For — and Look Out For — In Your Hardware and Software
- How to Determine What To Spend
- How to Select The Right Software Package For You
- How to Simply Define Your Computer System Requirements
- How to Minimize Costly Professional Help
- How to Select the Best System and Suppliers

Course Instructor: Arnold M. Roberts, president of ADC Associates brings to the tutorial extensive experience in seminar leadership having presented tutorials to managers across the country in the areas of data base management, networking and other application specific areas. Mr. Roberts has over twelve years experience in the field of Business Data Processing, with a strong background in systems analysis and design, technical support, in-house training as well as assisting corporations in the selection and integration of personal computers.

Microcomputers and Local Networks

- Overview of Networking and Definitions
- Hardware Issues
- Interconnection Technologies
- Microcomputers and Components
- Software Issues including Operating Systems
- Centralization vs. Decentralization
- Equipment and Systems: A look at Network Models
- Technology Trends and Future Directions

Course Instructor: J. Scott Haugdahl is a systems specialist at Architecture Technology Corporation, Minneapolis, Minnesota, a consulting firm specializing in computer architecture, including local networks and office systems. His work has included simulation and performance analysis of multi-processor computer systems, design and implementation of servers for local networks, and analysis of the latest developments and product offerings in the local computer network market. Mr. Haugdahl received his B.S.C.S. from the University of Minnesota Institute of Technology in 1980. He is a member of both the IEEE and ACM.

UNIX Tutorial for Managers

- The History of Unix
- UNIX — The Product
- Dynamics of the UNIX Marketplace
- Overview of Available UNIX Products
- Comparison of Hardware Systems
- A look at Application Software
- The Capabilities and Limitations of UNIX

Course Instructor: Jean Yates, president and associates of Yates Ventures specialize in researching UNIX systems, applications and the growing UNIX marketplace. Yates Ventures has been involved in extensive laboratory testing of UNIX related products and has been credited with producing 5 books on the subject. Well-known lecturer and industry consultant, Ms. Yates brings to the seminar both hands-on and technical experience of UNIX and UNIX related products as well as extensive user research.

Business Graphics for Managers

- Assessing Your Hardware Requirements Including Printers, Plotters and CRT’s
- Assessing Your Software Requirements Including Operating Systems and Interfaces
- Evaluating Current Business Graphics Software
- Developing and Using Business Graphics Software
- Producing Pie and Bar Charts
- Understanding Program Compatability
- Creating Presentations with Graphic “Slide Shows”

Course Instructor: James Morrison, independent consultant and educator, has trained many people in the area of microcomputers. As a contributing editor to LIST software publication and newsletter, and an evaluation expert for FIRST SOFTWARE, Mr. Morrison is a true professional in his field. He has published a number of books in the area of process which include subjects such as micro data communications, business software applications and “how to maintain” your microcomputer.

The Executive Microcomputer Workshop
Thursday and Friday, October 6 and 7.

An intensive two-day session for the busy executive or professional who needs to learn the basics of using a personal computer in the least possible amount of time. You’ll learn how to use the IBM PC and have concrete experience with Lotus’ 1-2-3 integrated software package.

The workshop will be given in conjunction with National Training Systems (NTS), a leader in providing microcomputer training products and sevices to large corporations.

The Executive Microcomputer Workshop will be held at the Long Beach Convention Center. Enrollment is limited.

NATIONAL TRAINING SYSTEMS, INC.

Register with this form, or call: 1-800-225-4698 In Mass. call 1-617-879-0700

To insure advance receipt of your conference credentials, mail form before September 21, 1983, with check, credit card or P.O. payment to: EMCE, 375 Cochituate Rd., Box 880, Framingham, MA 01701.

EMCE Long Beach is sponsored by CW Communications/Inc., publishers of *Computerworld*, *InfoWorld*, *ISO World* and *PC World* and is the largest and most respected publisher of computer-related newspapers and magazines in the world.

Name & Title _____
Company _____
Street or P.O. Box # _____
City, State, Zip _____
Area Code & Telephone _____

- | | |
|--|-------|
| ☐ Full Two Day Conference, Program & Exhibition | \$295 |
| ☐ Thursday Only, Conference Program & Exhibition | \$195 |
| ☐ Friday Only, Conference Program & Exhibition | \$195 |
| ☐ Two-day Executive Microcomputer Workshop | \$595 |
| ☐ Complete Three Day Package, tutorial (check one), exhibits & full conference registration | \$440 |
| ☐ “In Depth” Tutorials Wednesday, October 5, 9:00-5:30 (select one only) | \$195 |
| ☐ How to Select a Business/Personal Computer (T1) | |
| ☐ Microcomputers and Local Networks (T2) | |
| ☐ UNIX Tutorial for Managers (T3) | |
| ☐ Business Graphics for Managers (T4) | |
| (In Depth tutorials will be held at the R.M.S. Queen Mary, Long Beach, California). | |

Total \$ _____

- ☐ Bill Me
☐ Check Enclosed
☐ Bill Company P.O.# _____
☐ MasterCard
☐ American Express
☐ Visa/Bank Americard

Card Number _____

Expiration Date _____

Signature _____

Please Note
• Group Discounts available on request.
• Registrations cancelled later than September 28 are subject to a \$50.00 service charge. Registration may be transferred at no charge.

CWTS

Steel Mill Keeps Up to Date With Page System



U.S. Steel's plant in Lorain, Ohio

(Continued from SR/42)

printers and realized that as much as one third of the paper was wasted. "We would run the reports on four-part paper during the day and on six-part paper at night," he said.

"Sometimes we needed more copies of each report and other times fewer copies. The end result," he said, "was that we simply were wasting a lot of paper, and also had to decide who got the clearer first copies of the report and who had to settle for the poorer quality copies. We knew there had to be a better way to print and distribute these docu-

ments," he said.

The better way Pasciak was looking for turned out to be Honeywell, Inc.'s high-speed, nonimpact Page Processing System (PPS II). Pasciak's study confirmed that with the PPS II, Lorain Works would save about \$13,000 per year on paper costs and could also eliminate one of its impact printers.

"That was all the cost-justification management needed to approve the PPS II acquisition," Pasciak said. "The other benefits of the Honeywell system are gravy."

Lorain Works' PPS II prints at 8,000 line/min and accepts tape output directly from Pasciak's mainframe computers. A Honeywell minicomputer is part of the PPS II.

"Data for our daily reports is entered on our mainframe system and is copied onto tape," Pasciak said. "The tape is mounted on the PPS II's tape drive where it is copied onto disk for output to the nonimpact printer. In this way, all information about report generation and distribution, including numbers of copies per report, is computer-controlled according to U.S. Steel's standards."

"The PPS II has the ability to run unattended for 30 to 40 minutes. The serial collate feature allows us to load up the disk, walk away and check back in 30 to 40 minutes, the time it takes to fill up eight pockets holding 4,000 pages," he added.

In addition to faster speed, the Honeywell system has made other contributions to Pasciak's department. "The impact printers used the normal tractor-fed oversized computer printout paper, which was awkward to read, handle and file, as well as being generally low in print quality," he said.

"With the PPS II, we've standardized on regular 8½-in. by 11-in. paper for convenience and, since every copy is an original, the print quality is identical for the first and last name on each report's distribution list."

Pasciak estimates that his PPS II prints just under 1 million pages per month in terms of daily reports and other documents; the printer can be made to run more than twice as fast if output volume demands.

Also available are automatic hole punching, vertical or horizontal perforating and designing custom forms and fonts interactively using the PPS II's integrated computer.



An output tray of Honeywell's Page Processing System at U.S. Steel's Lorain Works

Take your microcomputer business around the world



The international microcomputer market is booming. An annual growth rate of 40% is forecast through the end of the 1980's. Countries that are recognizing the need to computerize their governments, industries, and universities are looking to low-cost micro computers, thus creating worldwide opportunities. Microcomputers are affordable, adaptable and efficient. And the supply cannot satisfy the demand.

Computerworld's international network of publications has the microcomputer market covered. We'll put you in touch with microcomputer buyers around the world through the special micro sections or monthly inserts in one or more of our 30 publications in 24 countries.

And we now publish separate monthly magazines for the microcomputer users in Australia (*MicroWorld*), West Germany (*MicroComputerwelt*), Sweden (*Mikro-*

Datorn) and Brazil (*MicroMundo*). Reporting the latest products and trends, these monthly magazines talk to the microcomputer buyers and users in these markets — in their own language — with locally edited news and international developments.

If you're marketing plans include the international market, the time to act is now. Micros are the fastest growing segment of the computer industry. Whether you want to test the market or are looking for a distributor or representative, we'll put you in touch with the right people around the micro world.

For more information on our international micro coverage, call Diana La Muraglia, Manager, International Marketing Services toll-free 800-343-6474 (in Mass. 617-879-0700) or return the coupon below.

Diana La Muraglia, Manager
International Marketing Services
CW COMMUNICATIONS/INC.
375 Cochituate Road, Box 880
Framingham, MA 01701
(617) 879-0700

Please send me more information on:

☐ Your micro publications ☐ Your other foreign publications

Name _____ Title _____

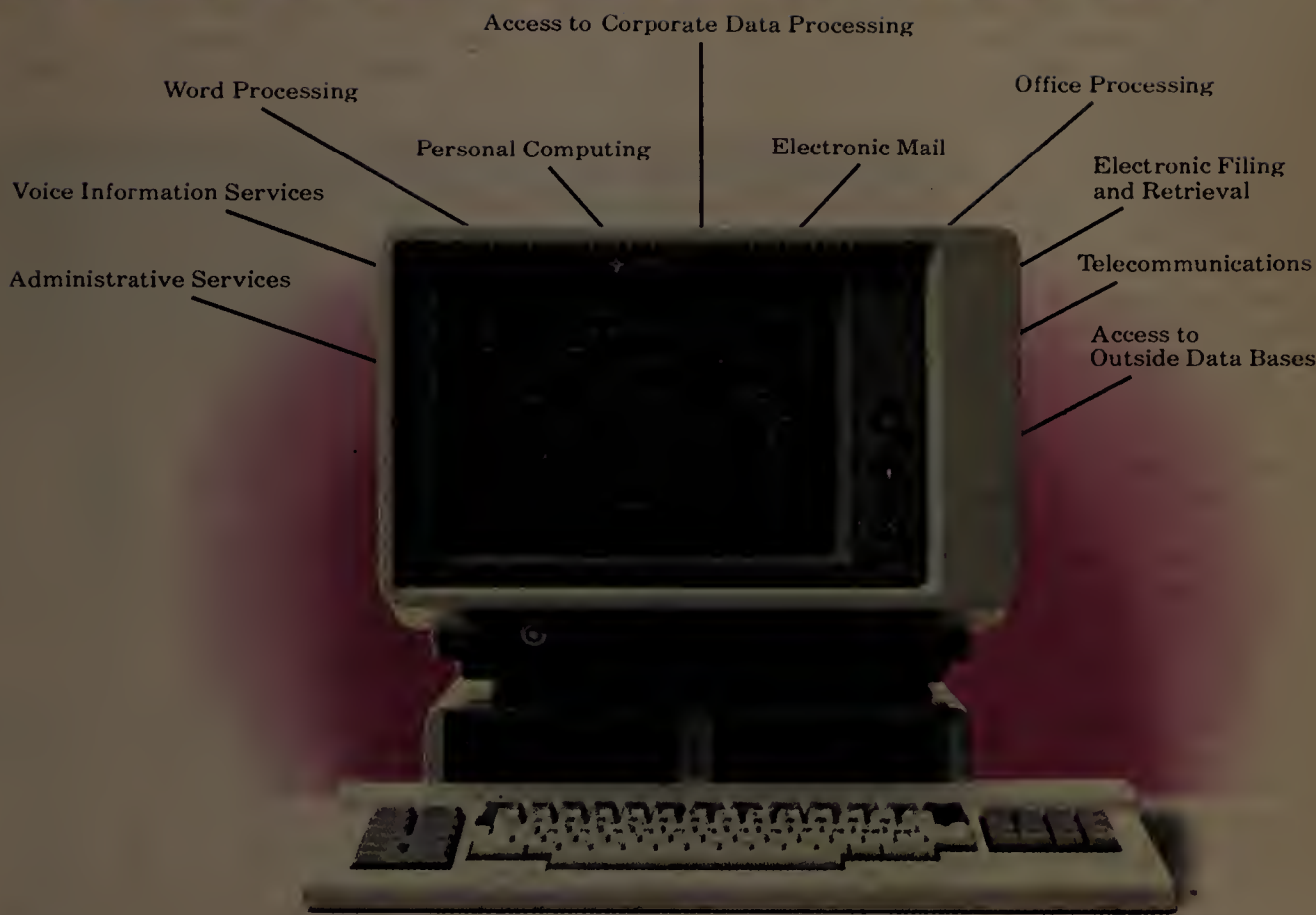
Company _____

Address _____

City _____ State _____ Zip _____

SPERRYLINK™

OFFICE SYSTEM



The office information system that puts the mainframe into the mainstream.

The SPERRYLINK Office System.

It's a personal computer. Time manager. Word processor. Data processor. Link to the corporation, and to the world outside. And it's a critical link to the wealth and immediacy of mainframe information, and the means to project it into the minute-by-minute business day.

And most importantly, any desk station can be any and all of these things, as intelligent as you want it to be — whenever and wherever the need arises.

When new needs arise, SPERRYLINK will rise to the challenge. Re-adapting as your company grows.

This is the SPERRYLINK System: built by people who see the mainframe not as a monolith, but as a readily accessible resource.

A system beyond conventional ideas of office automation. Beyond words and numbers, voice and image.

Because it doesn't just help people work better.

It helps people work together.

Information. Not automation.

SPERRYLINK™

OFFICE SYSTEM

Sperry Corporation, Computer Systems, Department 100,
P.O. Box 500, Blue Bell, PA 19424

Use this coupon for more information. Or call toll-free:

800-547-8362 (9 a.m. to 5 p.m. E.D.T.).

© Sperry Corporation 1983 SPERRYLINK is a trademark of Sperry Corporation.

Name _____ Title _____

Company _____

Address _____

City _____ State _____ ZIP _____

Telephone _____

We understand how important it is to listen.



Corporate DP Staff Equally as Happy Users Win Independence With Micro Revolution

By Martin A. Snow

Special to CW†

"Free at last," cry data processing users at the coming of the personal computer revolution. For them, the early years of data processing development have been filled with abusive delays, ineffective communications with management information systems (MIS) and a score of other annoying and unnecessary roadblocks to data systems development.

Increasing levels of analyst positions have now become a necessary means of translating the knowledge of separate groups of workers (who should not have become separate in the first place).

The current invasion of personal computing power has now provided organizations' users with the long-sought independence with which to meet their needs without the help of centralized DP departments — or so they think.

Further, this attitude is by no means restricted to the users. DP managers and their staffs couldn't be happier to emancipate the users. Why should they worry about the detailed development and control of applications programming if the users are content with their new-found personal computer self-reliance?

Should Be Confronted

These attitudes illustrate a DP trend that should be recognized and confronted before it is allowed to evolve into a serious problem for the coming transition to fully integrated personal computing. The ever-climbing demand curve for personal computers has created an organizational leap-before-you-look attitude toward the purchase and implementation of personal computers.

This approach to personal computing should not be perpetuated. Users, DPers and management must address the long-range issues of this transition and plan accordingly.

• Literacy — Personal computers have single-handedly raised the consciousness of the American public in regard to computing concepts. Professionals who have spent years sidestepping an understanding of what DPers were trying to explain are now comparing their bits-and-bytes expertise with any other user who will listen to their boasts of familiarity with high-technology

issues.

• Diversity — The independence to develop specific computing systems to address small-scale user needs has begun to create a diverse data processing environment in many organizations. This diversity will be DP's nature,

provided there is a stimulus for further creativity and more elegant solutions to functional system design. However, the maintenance of adequate control and coordination for such diverse systems will present increasingly complex challenges to

tomorrow's management.

• Networking — The imminent availability of cost-effective networking software ensures the eventual system compatibility of all organizationally related personal computers. These future networks will allow us-

ers to share effectively data, software, storage and even CPU resources. The evolution toward networking holds the exciting promise of combining the advantages of a mainframe network with the diversity of workstations.

(Continued on SR/50)

**THIS WEEK
INTERACTIVE
RELATIONAL
DATA BASE
TECHNOLOGY
FOR THE VAX
ENVIRONMENT
BECAME REALITY.
WE CALL IT ULTRA.™**

Marketing for Micros Different From Minis

By William G. Moore
Special to CW†

Not too long ago, clear distinctions between microcomputers and minicomputers could be seen in word length, cycle time, memory size and disk capacity. However, recent technical advances have just about erased these boundaries.

The difference between the two now is almost entirely subjective and has to do with the way computers are marketed rather than how they were designed.

Micros are commodity products that perform specific functions dictated by the mass market for which they are intended. Minis are small

(as opposed to mainframes), general-purpose computers that can be adapted to meet the requirements of a particular user.

While a microprocessor-based system can be configured to do almost anything a mini can, the marketing environment that created and sustains the "personal com-

puter explosion" will never let that happen on a large scale.

Availability and support of comprehensive vertical applications for micros are limited now and will always be limited because necessary distribution channels cannot exist in that marketplace as it has evolved.

Micros are inexpensive and perform a host of useful functions that appeal to experienced users as well as to first-time users.

Introductory-level documentation, nonintimidating showrooms, attractive software presentations and retail sales techniques all combine to make microcomputers especially visible and attractive.

Software is cheap, too. The micro software market has moved away from the "hackers" who got it started to commodity publishers who package a well-written program with good documentation, wrap it all in cellophane and move thousands over retail shelves like candy bars. That's why it's cheap.

Constrains Products

But mass-sale marketing also constrains the types of products that can be offered to those that have a general appeal to almost all computer users. Word processors, spreadsheets and data manipulators will find a place in almost any business, so these are the kinds of programs that get published.

An inventory management system for wholesale distributors has a limited market that does not fit the merchandising pattern as it has been established for microcomputer products and will, therefore, be hard to find.

Of course, there are general ledger, payroll and other financial packages for micros, but all of them are "vanilla" and require that the business adapt to the computer — not the opposite.

Quality application packages certainly exist for micros, but commodity-oriented retailers don't depend on them for their existence. They can't spend the time it takes to learn about a specialized application, and considerations within their own business actually discourage the practice.

Pricing competition has compressed margins to the point where they no longer sustain the research and technical expertise needed to sell and support this kind of software.

Retailers cannot afford to spend more than a few minutes of a sales clerk's time on a sale, and they need to do it in a very structured manner. This will be apparent to a prospective user who shops carefully.

The micro retailer will probably be able to demonstrate and compare a variety

(Continued on SR/51)

ULTRA

ULTRA INTERACTIVE DATA BASE SYSTEM™ is our new relational, totally integrated data base system that takes full advantage of the interactive DEC™ VAX™ super minicomputer environment. ULTRA's release this week follows more than five years of research, development and testing. We believe ULTRA may well be the most revolutionary advancement in the minicomputer industry since the VAX itself.

The Architecture Of The Future

More than just another minicomputer DBMS, ULTRA is a high performance, production-oriented relational system for the DEC VAX user. The power of ULTRA is the result of a modern software architecture which significantly expands the scope of VAX multiple-machine environments.

From building, processing and maintaining sophisticated applications, to answering the immediate information needs of end-users with 4th Generation problem solving tools, ULTRA is the only system which enables realization of the full potential of the VAX production environment.

And, ULTRA is closely compatible with TIS™, Cincom's integrated system for IBM mainframes. Now strategic information processing on the corporate IBM mainframe is consistent with the tactical applications of the VAX. Cincom's "IBM-DEC Connection" provides the answer to the compatible multi-machine and distributed needs of modern, large scale strategic/tactical processing.

ULTRA Components

The advanced ULTRA architecture includes the following components which provide full in-line integration, insulation from change, complete control and security of data and a consistent approach to

development— whatever the application:

- **The ULTRA Logical User View.** Modern, relational technology to insulate users and application programs from data structures and navigation requirements. The ultimate benefit: protection from change.
- **The ULTRA In-Line Directory.** Centralized control during program execution. Integration. Security.
- **The ULTRA DBMS.** High performance. Powerful. Faultless non-stop processing. Supports normalized data structures and provides for easy implementation of "subject" data base techniques.
- **The ULTRA Intelligent Query and Reporter.** Direct end-user access. Flexible and easy to use.
- **The ULTRA Data Manipulation Language.** So powerful even the most complex processing can be handled using four commands: GET, INSERT, UPDATE, DELETE.

The Ultimate VAX Software

If you now use, or are planning to use VAX, either as a stand-alone machine, in a network configuration, or in conjunction with IBM mainframe hardware, ULTRA can make consistency, control, low overhead, high performance and maximum flexibility a reality for your company.

For answers to your questions and an in-depth brochure on ULTRA, the ultimate in interactive data base software for VAX, simply contact our Marketing Services Department, 2300 Montana Ave., Cincinnati, OH 45211, or call us direct.

800-543-3010

(In Ohio: 513-661-6000)
(In Canada: 416-279-4220)



 **Cincom Systems**

Users Win Freedom With Micro Revolution

(Continued from SR/48)

● **Control** — As the speed and transaction volume of processing capabilities reach new heights, the need for comprehensive control mechanisms within those systems increases. DPer's must be confident in the reliability of reporting systems to produce data.

● **Credibility** — Do managers still apply some unconscious degree of reliability to computer-printed reports only because they have that computerized (therefore correct) look? If so, the sudden proliferation of personal computer printers may be giving a degree of undeserved weight to an avalanche of computer-printed, but still mediocre, data.

● **Security** — How does the organization protect this expensive portable equipment? Should users be allowed to take personal computers home as they wish?

● **Computerphobia vs. Tech Fever** — With the zeal of old-time religion, every manager now feels that he must have a personal computer. This dash toward personal automation is creating a vast amount of uncoordinated and inefficient information development efforts. How can organizations improve these efforts without putting a damper on the enthusiasm of this new generation of involved users?

The key issue in today's trend to integrate personal computers into the work place is the question of centralized data control vs. decentralized authority.

Personal computer power is providing an enthusiastic stimulant for all MIS users. However, if these benefits are to be effectively integrated, corporations must anticipate the long-term issues and establish a structure in which the growth and development of personal computer utilization will be as productive as possible.

In order to meet the challenges of the current trend toward user-controlled diversification, managers must establish a firm commitment to the centralization of data resources. This long-term strategy will benefit many of the critical corporate issues in the years to come. These issues affect such areas as data control, data development, reporting sophistication, shared resources, security and many others.

Also, as networking technologies are advanced, the commitment to centralization will become more and more feasible. The resulting centrally controlled, user-de-

veloped personal computer networks will mark the completion of the first important stage of MIS/personal computer evolution.

Firms must not allow today's rush for personal computer independence to take them too far from a working environment that will be conducive to the eventual re-

turn to centralization.

An outline of some of the necessary topics that should be addressed in a typical personal computer utilization development policy follows:

- Steering committees.
- Purchase coordination and approvals (hardware and software).
- Application program

documentation.

- Software libraries.
- Training and internal seminars.
- Communications (newsletters, for example).
- Security and back up guidelines.

It is interesting to see that many of these issues are now being recognized with the

newly developed concept of the information center. With hope, organizations that cannot yet make a commitment to that specific strategy will recognize the need to establish the guidelines noted above in order to tame the effects of this personal computer revolution before the first casualties occur.

SPINWRITER INTR

Now you have
a choice of
fully compatible
Spinwriters for
your IBM PC
and XT.

First, a few words about the original, the Spinwriter 3550.

It was the first and only totally compatible letter-quality printer for the IBM PC. It plugs directly into the IBM PC and works with every piece of IBM PC software, as well as all popular third-party application packages, such as WORDSTAR™, WORDPLUS™, VOLKSWRITER™, VISIWORD™, MULTIMATE™, BPS GRAPHICS™, LOTUS™ 1-2-3™, and VISICALC™.

It even looks like it was made for the IBM. Now, as good as the Spinwriter

3550 is, we recognize that a single printer can't take care of every business or professional office need. So we've added another IBM PC compatible Spinwriter: The 2050.



NEC MODELS OFFER SPEEDS OF 200 AND 350 WORDS PER MINUTE.

The new 2050 has a printing speed of 200 words per minute. And while it costs less, the print quality is still impeccable. So if low-volume letter-quality printing is what you need, the 2050 is your answer. 60 different print thimbles let your IBM PC look its best.

One of the things that gives our Spinwriter capabilities you can't even get on other printers is our unique "thimble." Each thimble holds up

to 128 characters. You can even have two different type faces on one thimble or print multiple languages from a single thimble. Think of how handy

OUR UNIQUE
"THIMBLE" PRINTER
OFFERS UP TO 128
CHARACTERS AND
HIGHER QUALITY
PRINTING.

Spinwriter is a trademark of NEC Corp. IBM is a trademark of International Business Machines Corp. WORDSTAR is a trademark of Micropro International Corp. WORDPLUS is a trademark of Professional Software, Inc. VOLKSWRITER is a trademark of Lifetime Software, Inc. VISIWORD and VISICALC are trademarks of Victory Corp. MULTIMATE is a trademark of Software Systems, Inc. BPS GRAPHICS is a trademark of Business & Professional Software, Inc. LOTUS and 1-2-3 are trademarks of Lotus Development Corp.

Microcomputers Are Commodity Products

(Continued from SR/49)
of word processors, spreadsheets and other general products, but will have little information to offer about specific applications.

It would be silly for anyone to go out and buy a computer just because it's a micro or a mini. There is no general category of things a mini can

do that a micro can't (or vice versa) because functionality within the capabilities of the hardware is a matter of implementation and programming.

A computer is used in business to solve problems and do specific work. A particular product either meets the requirements or it

doesn't. A novice cannot perform this kind of evaluation without professional assistance, and few neighborhood computer stores are able to provide the right kind of help.

This is not to say that people who work in computer stores aren't professionals, because most of them are;

but the profession they represent is retailing, not computer science.

The microcomputer explosion has created a new class of first-time users, while also creating a new class of first-time computer vendors. Many users would be much better off with a more powerful mini, but they don't

know that and neither do their dealers.

All too often, neither the buyer nor the seller has any knowledge of computer technology and how it can be applied to solve business problems. Yet between them, they select and install thousands of systems every month.

Microcomputers are visible because of the way they are marketed — the software is impressive; the sales presentation is dazzling; and the price is right. All this generates billions of dollars in sales every year, not because of any quality inherent in the fact that these products contain microprocessors, but because they can be packaged and sold as "commodity computers."

Commodity Concept

Manufacturers, retailers and software publishers in this new business can't pursue the vertical applications market because they don't fit the mass merchandising, "commodity computer" concept, but independent sales organizations are discovering that it offers them an outstanding opportunity.

They can configure hardware to rival the performance of a powerful mini, couple it with their own specialized applications package and be competitive in almost any vertical market. But the mini vendors ought to prevail in this kind of competition.

Pricing tracks performance more than processor implementation so that microcomputer systems configured to perform the same as minis will likely cost the same also.

Minicomputer vendors have the edge once the price issue is settled, because they're usually backed by large national organizations that are not devoting their best resources to merchandising a retail product for mass consumption.

Repair and support services, training, software distribution and skill in the application of computer technology to business needs are all areas where they can excel.

System-level software for minicomputers is generally superior to that available for micros and probably always will be. The mass-market requirement will tend to retard development of sophisticated multiuser operating systems and telecommunications packages for micros.

Moore is manager of large systems planning at Honeywell, Inc.

PRODUCES A SPINOFF

that would be if your business is international.

On the other hand if you have special printing needs, you can opt for a full alphabet plus numbers, sub- and superscripting and scientific and arithmetic symbols.

Incidentally, for all their versatility, our inexpensive

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ
АБВГДЕЖЗИЙКЛМНОПРСТУФХ
ABCDEFGHIJKLMNOPQRSTUVWXYZ
Δ+R≡³ρ/+⁰&\≡/⁰¹²³⁴⁵⁶⁷⁸⁹≥≤≠
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ
~£!~,"\$%&'()*+,-./:;@A"æø

SPINWRITER OFFERS OVER 60 DIFFERENT TYPE FACES.

thimbles last for over 30 million impressions.

So it won't end up costing you a fortune to look like a million.

No matter what form your business takes, Spinwriter can handle it.

A Spinwriter can actually

help you put your communications in better shape. It can use any of our nine interchangeable forms handling options. And they can all be easily installed and changed by the operator.

Want to dash off a few hundred original letters to your customers? Our sheet-feeder is just the ticket. It will print on your letterhead and second sheet or envelope.

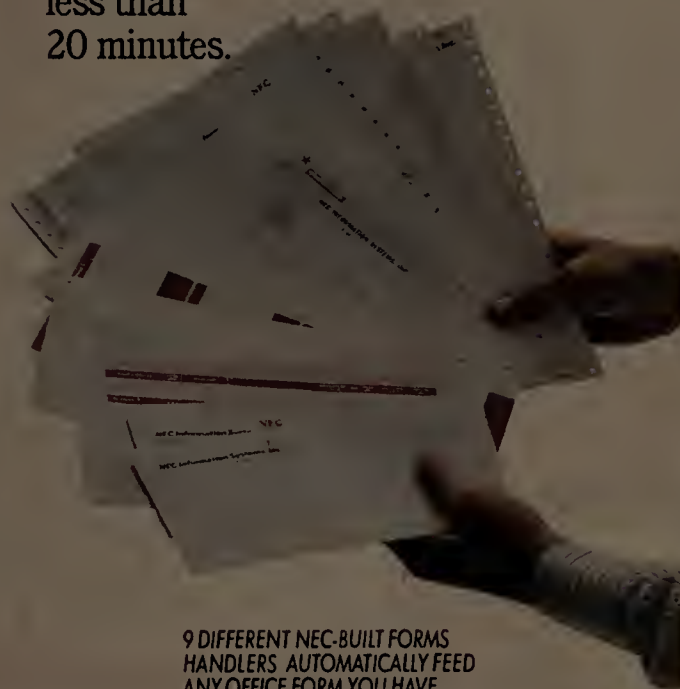
Standard features include continuous forms handlers that take paper up to 16 inches wide, variable size forms, and multi-part forms.

Spinwriters have a hard-earned reputation for reliability.

Spinwriters hold the industry record for mean-time-between-failure. Over 3,000 hours. Which, in terms of average personal computer usage, adds up to more than two trouble-free years.

One reason for Spinwriters' staying power is the fact that we manufacture every major component. It also helps explain why NEC Information Systems is the number one supplier of letter-quality printers to PC users in America. Of course, someday you may need a little service. If you do, it's nearby. We have a large group of

NEC-trained professionals all around the country. It's also quick. Because of our modular design, normal repairs take less than 20 minutes.

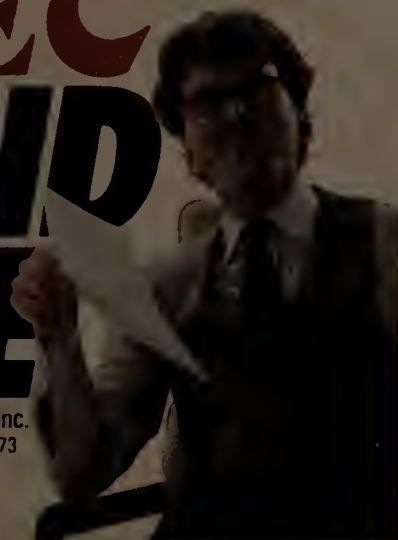


9 DIFFERENT NEC-BUILT FORMS HANDLERS AUTOMATICALLY FEED ANY OFFICE FORM YOU HAVE.

You'll find Spinwriters at participating ComputerLand stores, Sears Business Systems Centers, IBM Product Centers nationwide, Entré Computer Centers and authorized NEC Spinwriter distributors. Or call 800-343-4418 for more information. And find out why more and more IBM PC users are saying, "NEC and me."

NEC AND ME

NEC Information Systems, Inc.
5 Milkia Drive, Lexington, MA, 02173



SPINWRITER CAN OPTIMIZE YOUR IBM PC CAPABILITIES.

What's it worth to you...if Zilog can prove that System 8000 is the most powerful Unix-based microcomputer you can buy?*



There's only one way to prove that one computer system will outperform all others. Benchmark it. Test it. Then compare the results! That's the challenge we're giving to OEM's and systems houses serious about multi-user systems. Run your benchmarks on any other two UNIX-based micros and...

1. WE'LL PROVE...that the System 8000 has more raw computing power—so your CPU-bound programs run faster.

2. WE'LL PROVE...that the System 8000 achieves higher data throughput; that it can open bottlenecks in your I/O-bound applications.

3. WE'LL PROVE...that the System 8000 supports the UNIX operating system more efficiently; that our computers spend less time running the operating system and more time running your programs.

4. WE'LL PROVE...that the System 8000 family best withstands the demands of a multi-user environment; that its carefully designed architecture compares with that of minicomputers.

So, what's it worth to you if we can prove System 8000 is the most powerful UNIX-based micro you can buy? Money? Time? How about your success as an OEM?

The System 8000 family is priced from \$14,950 to \$37,950. Its industry-compatible languages open a wide range of mini-computer applications, making it the best buy for your money.

But don't take our word for it...

Take the System 8000 Challenge. Send for our challenge kit and test any other two UNIX-based micros. Bring your results into any Zilog sales office and compare them with the tests you run on the System 8000. If we don't win, then we'll give you something valuable for taking the challenge. Call Zilog toll free at 800-841-2255 for your challenge kit and start comparing today. Or write: Zilog, Inc., Corporate Publications, A1-5, 1315 Dell Avenue, Campbell, CA 95008.

*UNIX is a trademark of Bell Laboratories

Zilog

Pioneering the Microworld

An affiliate of **EXXON** Corporation

Health Firm's Ills Lead to Info Center Cure

LOS ANGELES — Faced with an increasing volume of requests for on-demand reports, Kaiser Permanente, a nationwide provider of health care services, decided to give the information center concept a try at its Southern California regional headquarters here.

Kaiser Permanente's version of the information center, called the User Development Application Center (Udac), was implemented a little over two years ago using Answer/DB, an on-line report writer from Informatics General Corp., as the primary tool for on-demand report generation. Since then, a wide range of company personnel has learned to use the center's resources to produce their own reports, according to Diana Turner, supervisor of Udac's user consultant area.

Turner said Udac was established as a response to pressures from users. "We

did not have the manpower within ISD [information services department] to respond to their ad hoc report requests in a timely manner, so we created Udac to free our programmers to do planned development work," she said.

"We've found that as many as three-fourths of the ad hoc requests can be satisfied by the users themselves," she said. "Our programmers in ISD appreciate being relieved of this on-demand report work load. The user is more than glad to take over the task and to learn how to get the reports he wants as soon as he wants them."

Turner emphasized that security of files and data bases is a prime consideration. "We control all the user file allocations, for example, and decide when they'll run and for how long," she said. "Users are required to stay within a controlling program — the system pre-

vents them from exiting from it and performing unauthorized tasks. We also limit the size of their report files so that if they happen to make a mistake, there is only so much output they can produce. We try to make it extremely difficult for the users to interfere with normal production work loads."

Kaiser Permanente's Southern California regional headquarters serves eight medical centers, each with a major clinic and approximately 30 small clinics. Hardware at the headquarters here includes IBM 3033U and 3033N mainframes running OS/MVS with Vtam. Terminals include IBM 3276s and 3278s and several types of dial-up terminals.

The primary objective of Udac is to enable both ISD and non-ISD personnel to have appropriate levels of direct access to ISD resources. As a secondary

(Continued on Page 66)

Runs on IBM 370, Compatibles

Unicalc Unwraps Spreadsheet Package

WAYNE, Pa. — Unicalc Corp. has announced an electronic spreadsheet package that features a general-purpose interface capability to data base management system (DBMS) files on the IBM mainframe.

The Unicalc/DB package is designed for use with any IBM or compatible system

that uses an IBM 370 architecture, including the IBM 370, 4300 and 30 series and plug-compatible mainframes. The package runs under most IBM operating systems, including VM, DOS/VSE or MVS and teleprocessing monitors, a spokesman said.

The package offers multisheet addressing and employs syntax and commands

similar to Visicorp's Visicalc. Data can be entered into the Unicalc/DB spreadsheet with a standard IBM 3270 terminal or with a compatible device. Users can address rows and columns by coordinate or by logical names and can manipulate screens to view any part of the work sheet.

File structures that can be accessed by the package include IBM's DL/1, IMS and Vsam; Cullinet Software, Inc.'s IDMS; Software AG of North America, Inc.'s Adabas; Cincom Systems, Inc.'s Total; and Applied Data Research, Inc.'s Datacom/DB. Users can determine where on the spreadsheet data will be written from the DBMS, the spokesman claimed.

IBM DOS/VSE Update Improves Display Request Response Time

MINNEAPOLIS — B.I. Moyle Associates, Inc. has announced an enhancement for IBM's DOS/VSE power spooling system that improves response time to queue display requests.

The BIM-Power Dynamic Queue (PDQ) package retains a copy of the Power queue file in virtual memory and can satisfy queue display requests without performing any disk I/O, a spokesman said. Performance is improved through nearly instantaneous response to queue display requests and in reduced disk unit and channel contention.

Queue accesses from other software, such as most on-line program editors or terminal printer spooling systems, are also intercepted by BIM-PDQ, the spokesman said.

An optional feature automatically deletes jobs left in the Power queue longer than a user-specified time limit. This feature also improves Power queue access performance by eliminating the need to read over inactive entries.

The package is base priced at \$2,000. B.I. Moyle Associates is located at 5788 Lincoln Drive, Minneapolis, Minn. 55436.

Users can invoke mathematical functions such as net present value and define new functions that may be used in other formulas. The package is enhanced with a series of utilities which allows the DP department to allocate the system resources that any department, user or sheet may be given, the spokesman said. A librarian program designed to archive automatically or restore users' sheets is also available.

The Unicalc/DB is available for \$19,500 on a CPU license from Unicalc, Two Academy Lane, Wayne, Pa. 19087.

CICS Users: Increase System Uptime

Look at the benefits when you install **DADS**, a **D**ynamic **A**llocation **D**eallocation **S**ubsystem:

- Improve Mean Time to Recover
- Ease Batch Scheduling Constraints
- Avoid Initiation Delays
- Simplify Problem Determination
- Improve CICS System Productivity

Take **DADS** Advice for Greater CICS Availability

If you're a CICS/MVS user, take **DADS** advice today! Call collect **203 529 7128** or return this coupon to our attention.

CW-9/26/83

- ☐ Send me **DADS** for a 30 day free trial.
- ☐ I'm interested, please provide more information about **DADS**.
- ☐ Also please provide information about the complete family of software products available from **STAR**.

Name	Title		
Organization	Telephone		
Address			
City	State	ZIP	



QCM Performance Monitor Gets Two Enhancements

PITTSBURGH, Pa. — Duquesne Systems, Inc. has released two new enhancements for the event-driven Quantitative Computer Management (QCM) performance monitor for IBM's MVS operating system.

The Task Measurement Facility reportedly allows users to obtain QCM

measurements at the task level within an address space, rather than at the total address space level, which is useful in tuning subsystems.

The Operation Code Analyzer produces reports showing the systemwide frequency of use of various machine operation codes.

The QCM performance monitor with its two enhancements costs \$14,000 from Duquesne Systems, Two Allegheny Center, Pittsburgh, Pa. 15212.

MCBA Updates 'Report Writer'

MONTROSE, Calif. — Mini-Computer Business Applications, Inc. (MCBA) has announced Release 2 of its Report Writer package for Digital Equipment Corp. PDP-11s with the RSTS/E operating system.

The Dibol package is said to interface with all other MCBA packages in addition to non-MCBA files, including sequential files with no control record and Dibol Isam files.

The report writer is table driven and parameter driven with no source code generated. Data files are opened in the input mode so that data integrity is reportedly not threatened.

A source code license for the RSTS/E Report Writer, which comes with a software reference manual and a user's manual, is \$2,000 for use on the first computer.

Mini-Computer Business Applications is located at 2441 Honolulu Ave., Montrose, Calif. 91020.

Text Editor Out For VAX Users

CAMBRIDGE, Mass. — Computer Corp. of America has unveiled a text editor for Digital Equipment Corp.'s VAX-11 hardware running on UCB Unix or DEC VMS operating codes.

Dubbed Emacs, the new software package is intended to be used for programming, as part of decision-support systems or for large-scale text processing, the vendor said.

Prices range from \$350 to \$850 from Computer Corp. of America, which is located at Four Cambridge Center, Cambridge, Mass. 02142.

ADP Network Develops Project Management System

ANN ARBOR, Mich. — ADP Network Services has announced the development of an integrated project management system for computers ranging from mainframes through micros.

The Apecs/8000 was designed to include a range of information capabilities with multiple delivery mechanisms to accommodate projects of varying sizes.

According to the vendor, the system starts with a management objective that is typically too complex to manage, breaks it down into components and then consolidates the detailed data.

The Apecs/8000 is based on a rela-

tional data base management system providing a collection of data that is then drawn upon for calculations, reports and graphs. It includes earned-value analysis, application building techniques and a range of graphics and writing capabilities.

The system will be available in November for 16-bit micro computers and early in 1984 for other 32-bit mid-range and mainframe computers, including those from IBM and Digital Equipment Corp.'s VAX-11.

Prices, including hardware, range from \$2,000/mo to \$9,000/mo from ADP Network Services, which is located at 175 Jackson Plaza, Ann Arbor, Mich. 48106.

Info Center Handles Reports

(Continued from Page 65)

objective, the center participates and assists in developing and implementing short-term computer applications.

A third objective of Udac is to help make ISD resources and consulting services available to independent user developers within the company, Turner said. For example, Udac personnel will provide assistance to users in developing Cobol applications and in the use of Informatics' Mark IV implementation system for batch applications.

Each of the software tools is used

for a specific user need. Answer/DB is used for simplified language oriented toward end users with minimal computer training and experience, she said. Mark IV is an implementation tool used by more sophisticated users for batch system design, implementation and updating.

"Education for the end user is one of our most important activities in Udac," she said. "Typically, we provide them with three courses: an introduction to data processing, an introduction to data communications and how to use Answer/DB.

Three Reasons System/Manager Stands Alone

No other DOS/VS(E) resource management system comes close to Corodale's System/Manager for overall ease of use and hardware efficiency. It's the complete resource manager. Because of three perfectly integrated components.

Space/Manager

Improves disk space and disk file control. Increases capacity by up to 50%.

Tape/Manager

Controls tape allocation and usage. Minimizes clerical time, ensures security and integrity.

JCL/Manager

Reduces job stream set up and maintenance. Streamlines operational efficiency and throughput.

In just 15 minutes, System/Manager can be up and running, paying for itself. And its modularity means you won't outgrow it, it won't outgrow you. We'll even let you prove all this in your own environment for a full 27 days.

Write or call for our Cost Analysis/Justification Worksheet and detailed information.

Offices in Boston, Chicago, Montreal. Also in London, Amsterdam, Dusseldorf, Helsinki, Sydney, Manila. TLX 710-3216747



Corodale
Incorporated

211 Congress Street
Boston MA 02110
617-426-8780

EVERY YEAR WE REMANUFACTURE THOUSANDS OF DISC HEADS PEOPLE ALMOST GAVE UP ON.



There's no need to give up on a crashed disc head. Infoextend can remanufacture most heads and have them perform "like new." Infoextend products are part of Information Magnetix Caribe, the world's largest manufacturer of rigid media disc heads.

We remanufacture heads using the same components, and test with the same equipment as on our new head manufacturing line. The result — a remanufactured head with new head performance, without new head cost. Don't give up on your crashed heads, send them to us. We'll make them perform "like-new." To prove our point, we'll give you \$5 off your first remanufacture order with us.

Call (800) 468-2000 for details on how to get your \$5 discount. **START SAVING NOW!**

INFOEXTEND
PRODUCTS

Infoextend Products are made by Information Magnetix Caribe Inc. A subsidiary of CCT.

Data Base Tool Targets DPers In DL/1 Shops

PLYMOUTH, Minn. — A data base tool said to improve productivity of data base administrators and applications programmers in IBM DL/1 data base environments has been announced by MBI Systems, Inc.

The On-line Program Specification Block Inquiry and Edit (Opie) product reportedly provides immediate access to current program specification block information and edits the program specification block against the data base description from any CICS terminal.

The vendor said Opie eliminates the need to maintain and refer to printed listings in order to determine current specification block status. Programmers using the product need not check with data base administration to determine if a specification block is ready for use, a spokesman said.

The product is available for \$1,000 from MBI Systems, 3030 Harbor Lane, Plymouth, Minn. 55441.

'Dash' Version Offered, Runs On DEC VAX-11

LITTLETON, Colo. — Interactive Systems Corp. has announced Version 2.0 of its Drawing Access and Storage Handler (Dash) two-dimensional computer-aided design and drafting software package.

Dash can be installed on all members of Digital Equipment Corp.'s VAX-11 family of minicomputers operating under the VMS operating system, a spokesman said.

Improvements reportedly include options of running a black-and-white terminal or a color terminal with a palette of seven colors. The package supports multiple users, offers system security and provides data base sharing, the vendor said.

The system reportedly conforms to U.S. Department of Defense and National Aeronautics and Space Administration drawing specifications and is available for \$20,000 from Interactive Systems, 5500 S. Sycamore St., Littleton, Colo. 80120.

Package Debuts For Distributors

KENNEWICK, Wash. — An industrial wholesaler distribution package that runs on Datapoint Corp. hardware has been announced by the Kennewick Industrial & Electrical Supply Co., Inc.

The vendor said the package will handle most functions of the distribution business on both retail and wholesale levels.

The package reportedly contains full accounting software, including general ledger, accounts payable, accounts receivable, operations control and financial and sales analyses.

The package is priced from \$65,000 from Kennewick Industrial, 113 E. Columbia Drive, Kennewick, Wash. 99336.

To DEC Professional Series

Package Provides 3270 Emulation

HOBOKEN, N.J. — A package providing IBM 3270 protocol emulation to Digital Equipment Corp.'s Professional 300 series of personal computers has been announced by Advanced Systems Concepts, Inc. (Asci).

Professional Intersystem Management (Prism) runs under DEC's P/OS operating system, Versions 1.5 and 1.7, emulating an IBM 3276 controller with up to four communications paths, according to Asci.

Additionally, Asci announced the

Remote Printer Sub-System, RP32, a package enabling users of DEC's VAX computers to designate printers on remote computer systems.

The vendor said Prism has two facilities: virtual terminal emulation, which causes the Professional's keyboard and display to appear as an IBM 3278 Model 2 display station and the printer to appear as an IBM 3278 printer; and intersystem task facility, which allows a program on the Professional to communicate with a program on the IBM system.

Prism is available for \$595; RP32 is priced at \$900 for host software and \$200 for listener software from 22 Hudson Place, Hoboken, N.J. 07030.

Automated Aids Out for Method/1

CHICAGO — Arthur Andersen & Co. has announced the release of two automated aids designed to simplify project management tasks for users of Method/1, its information systems development methodology. The software was designed for IBM's Personal Computer.

Estimate/1 automates the project estimating process using a series of Visicorp's Visicalc templates. Track/1 is a time reporting and project control system that allows managers to set up and maintain programs.

The aids sell for \$1,000 from 69 W. Washington St., Chicago, Ill. 60602.



Trying to read these hex dumps is like pulling a sword out of a stone.

Knights of the Dump Table

How many nights have you and your knights (or fair maidens) spent in a quest to uncover the cause of a programabend or cancel.

Armed with the old fashioned memory dump, weighed down with a lot of manuals—it's as though Merlin put a hex on your productivity.

There is a better way. A Camelot. The greatest moment in Dump History. And it's known as Abend-AID.

Abend-AID transfers the burden of debugging from the programmer to the computer, thus setting the programmer free for more productive crusades.

Be a crusader.

Set your knights free.

Suit-up. Arm yourself with Abend-AID.

Abend-AID is available for both IBM OS and DOS installations. Listed below are unique Abend-AID options for your specific needs.

☐ **Abend-AID/COBOL** - The first practical source level debugging tool.

☐ **Abend-AID/ONLINE** - 80 column "easy-to-use" viewing capability and a unique TSO/SPF option which permits programmers to interactively debug abends at their terminals.

☐ **Abend-AID DOS/DL1 and Abend-AID OS/IMS.** Features special diagnostic routines for IBM's data base systems.

FREE Abend-AID product evaluation.

For additional product information or to arrange for your 30 day FREE evaluation of Abend-AID, joust give us a call at 800-521-9353 (in Canada or Michigan, 313-540-0400) or impale your business card on this ad and mail it to: Compuware, Systems Software Division, 32100 Telegraph Road, Birmingham, Michigan 48010.



Corporate Headquarters
32100 Telegraph Road
Birmingham, Michigan 48010
(313) 540-0400

International Offices: Tokyo, JAPAN Phone: (81-3) 479-1600 / New South Wales, AUSTRALIA Phone: (61-2) 816-1177 / Bryanston, SOUTH AFRICA Phone: (27-11) 787-5600 / Herzliya, ISRAEL Phone: (972-52) 58912 / Oslo, NORWAY Phone: (47-2) 56-5570 / Luton, Bedfordshire, ENGLAND Phone: (44-582) 28-463 / Paris, FRANCE Phone: (33-1) 247-1341 / Milano, ITALY Phone: (39-2) 345-2211 / Hamburg, W. GERMANY Phone: (49-40) 280-1333

COMPUWARE
SYSTEMS SOFTWARE THAT MAKES SENSE



IMS Introduces On-Line Tool For System/38

MARINA DEL REY, Calif. — International Management Systems Corp. (IMS) has introduced a new on-line accounts receivable system for the IBM System/38.

The package maintains information on a company's receivables and provides users with credit management tools, such as daily aging and unlimited comments section, a spokesman said.

Cash receipts can be applied against specific open items or balance due, and accounts are automatically adjusted by cash discounts and write-offs, according to the vendor spokesman.

The system is available for a license fee that ranges from \$8,500 to \$13,500 from IMS, located at 4676 Admiralty Way, Marina Del Rey, Calif. 90291.

Ansi X3 Group Votes to Include Fortran Interface

WASHINGTON, D.C. — The American National Standards Institute's (Ansi) X3 technical committee on computer graphics has voted to include complete programming language interface descriptions as part of the draft-proposed American National Standard Graphical Kernel Systems. A subroutine interface specification for ANS Fortran will be the first such language interface.

In other standards action, the information processing technical committee of the International Standards Organization has begun work on an Ansi proposal for a Virtual Device Metafile (VDM) standard for computer graphics. The VDM provides a standardized method of storing graphics images from later processing and of exchanging images between graphics systems.

Both the Fortran interface and the VDM proposals will be presented for review this fall.

'Insurmite' Out For IBM Minis

ALAMEDA, Calif. — Administrative Data Corp. (ADM) has introduced Insurmite, an agency/brokerage administrative system for IBM System/23 and System/36 minicomputers.

All informational screens have alpha name search options. Other features include a general ledger for multibranches which supports cash or accrual accounting, optional claims and policy service modules and payables with an optional check writer which is run on demand with work sheets for account current or item payables.

The product, which includes IBM hardware, starts at \$14,000 and is expandable up to 30 workstations, the vendor said.

Additional information is available from ADC, 512 Westline Drive, Alameda, Calif. 94501.

SPSS-X Gets 'Userproc' Facility Upgrade

CHICAGO — Users of SPSS, Inc.'s SPSS-X information analysis systems can add customized procedures or stand-alone programs to their sys-

tems with the SPSS's Userproc facility upgrade.

Userproc allows end users to tailor computing tools or add Fortran or

Cobol programs. These user-defined programs become procedures of SPSS-X, with the ability to read data, retrieve data labels, check for missing values and print error messages.

Userproc comes with a subroutine library containing necessary service facilities and many statistical subroutines to interface with stand-alone programs, a spokesman said. In addition to Userproc, Release 2 of SPSS-X includes a data cleaning facility and enhanced report writer.

SPSS-X currently runs on IBM CMS and CS and on Digital Equipment Corp. VAX-11 systems. The Userproc enhancement is available free of charge to current SPSS-X users. Annual license fees begin at \$4,000 from the company at 444 N Michigan Ave., Chicago, Ill. 60611.

IBM Micro Link Unveiled

LAWRENCE, Mass. — Genesys Software Systems, Inc. has announced an IBM Personal Computer integration capability for its Human Resource Management Software (HRMS) for IBM mainframes.

Genesys users can select data from the mainframe payroll, personnel or deferred benefits data base and download it to the Personal Computer with a single keystroke, a spokesman said. The link operates as a module of Genesys' on-line All-Screen

system and is fully compatible with Genesys' Telecommunications and Information/Decision System.

The facility is available at no additional cost to users. The HRMS system has four different modules. Payroll costs \$42,000; personnel costs \$54,000; benefits costs \$59,000 if integrated with payroll and personnel; \$110,000 stand-alone. All-Screen costs \$35,000. Prices include unlimited support from Genesys at 10 Grafton St., Lawrence, Mass. 01843.



**Why buy
two personal computers when
you can get four workstations
and a real business computer
for less?**

Batch Contouring System Receives Enhancements

AUSTIN, Texas — Radian Corp. has announced a series of enhancements to its Interactive Contour Plotting System (CPS)-1/G batch contouring system.

The enhancements provide real-time multiple surface operations; the capability to contour directly up to faults; screen to hard-copy output at any time during processing; control-point input from external files; orthogonal contouring; and an enhanced file management system, a spokesman said.

Available for use on a variety of computers and output devices for interactive contour map creation, analysis and editing, CPS-1/G is priced at

\$28,000 in the U.S. and \$36,000 overseas. More information is available from Radian Corp., 8501 Mo-Pac Blvd., P.O. Box 9948, Austin, Texas 78766.

Info '83 Giveaway Announced

BOSTON — Integrated Planning, Inc. has announced that it will sponsor a contest at the October Info '83 trade show in New York. The winning firm will receive a free copy of the Stratagem decision support system, which licenses for \$85,000.

Contestants must determine how much is in the Stratagem Money Bowl located at the Integrated Plan-

ning booth.

PALO ALTO, Calif. — Remote Computing Corp. has announced a Loan Origination and Tracking System designed for use with an IBM Series/1 minicomputer using Pick and Associates, Inc.'s Pick operating system.

Features include loan tracking

from application through closing, immediate on-line inquiry, sales commitment tracking, automated document preparation and custom reports.

Standard reports include an application register and reports for savings and loans, status reports by origination location, producer and processor, and funded loans and canceled applications by date.

The cost for the Loan Origination and Tracking System is \$17,000 from Remote Computing at 1076 E. Meadow Circle, Palo Alto, Calif. 94303.

Data Base Service Out for Analysts Using IBM Micro

ANN ARBOR, Mich. — ADP Network Services, Inc. recently announced a data bank service for business analysts and forecasters using IBM Personal Computers.

The Datapath service provides access to data bases with information on 8,500 industrial corporations, 14,000 commercial banks, 4,000 savings and loan institutions and more than 90,000 securities, a spokesman said. Also available on the service are quarterly financial statements for reporting companies, weekly stock market quotes and forecasts by Townsend-Greenspan & Co., Inc.

Users may call information to their own format and report structures, or they may utilize ADP's Applications Library. The company said that the library will provide analytical frameworks for use with Lotus Development Corp.'s Lotus 1-2-3 integrated software package.

The price of the vendor's Datapac software is \$235/copy, or it may be purchased with the Lotus package for a total of \$690. Monthly fees are based on transactions, with an account minimum of \$100/month. More information is available from ADP Network Services, 175 Jackson Plaza, Ann Arbor, Mich. 48106.

ATM Unveils Revision 5 Of 'Monitor'

HOUSTON — ATM Computing Services has announced Revision 5 of Monitor, a performance measurement package for Prime Computer, Inc. computers, expanded to run on Primos Revision 18 and 19 and Prime Information operating systems.

Monitor aids in identifying specific user-related problems, which may be corrected by rescheduling the work load or by system reconfigurations. In those cases where additional hardware will improve the performance, Monitor aids in selecting the hardware, the vendor said.

The following new reports are available as options: CPU vs. paging, disk vs. paging, disk vs. buffering, disk access time in msecs and sampling time in msecs.

The price is \$2,250, which includes maintenance for the first year, from ATM, P.O. Box 1885, Houston, Texas 77001.



By the time you equip two good personal computers and get them up and running, your small initial investment will have escalated into a big one. And the productivity problems you intended to solve will have grown as well.

Datamedia offers a better way to computerize your office systems.

For a much lower cost per workstation, you can install a new Datamedia 932 System™ departmental computer, four workstations, an integrated data base management system, and applications software specifically designed to be shared. And with every other workstation you add to the 932 System, the cost per workstation goes down.

If you've already installed some personal computers, you can get a much bigger return on your investment by using them as workstations on our Datamedia 932. They can still handle personal computing tasks whenever you wish, but the 932 will let them get down to business the rest of the time.

Up to 16 people can simultaneously share the 932's powerful, 32-bit central processing unit, its interactive operating system (featuring the most powerful relational data base

management software in the industry), and a common data base.

A Datamedia 932 System can be configured according to your specific requirements. And you'll be able to choose from the broadest range of big-system business applications software on the market, as well as from a variety of standard software.

You'll also receive continued support from us, and from a growing network of knowledgeable, service-minded dealers.

Find out more about the Datamedia 932 System, and the location of the authorized Datamedia dealer nearest you. Call 1-800-DMC-CORP. (In New Jersey, call 1-609-665-5400.) Or write Datamedia Corporation, 7401 Central Highway, Pennsauken, NJ 08109.



Getting Business Computing Together.

Release 5.0 of 'Abstract/38'

Data Base Reporter Updated

CHICAGO — Advanced Systems Concepts, Inc. has announced Release 5.0 of Abstract/38, a data base reporter for the IBM System/38. The system includes program and data base reporting. Program-level documentation includes program flow charts, procedure explosion reports and source code listings.

The new release performs control language analysis at the object level instead of at the source-code level, the vendor said.

Abstract/38 allows data base information to be reported for both external file descriptions and internally described RPG program descriptions.

A one-time license fee is \$1,000,

and the product is available for a two-week trial inspection. Further information is available by contacting the vendor at 1084 Cornell, Wheeling, Ill. 60090.

HP Guide Out for IBM Micro

PALO ALTO, Calif. — Hewlett-Packard Co. is offering a new software guide designed to help the IBM Personal Computer user choose among 10 graphics software packages that produce high-quality charts and graphs on the HP 7470A graphics plotter.

The guide, Publication 5953-4169, also lists detailed information on

connecting the HP 7470A to the IBM Personal Computer — including recommended system configuration — along with connection instructions and communication verification.

The publication can be obtained free of charge from local HP distributors or by contacting HP, which is located at 1820 Embarcadero Road, Palo Alto, Calif. 94303.

DOS operating systems.

Impact is an aid for reinsurance brokers or lead underwriters charged with the pricing of catastrophe treaties. Given the base-year written premium, policyholder surplus and estimated premium income for the coming year and by varying the limits, retention, primary layer and premium rate, this product calculates the subject premium, payback in years, company retention expressed as percentage of estimated premium and policyholder surplus and cost of catastrophe coverage per thousand dollars of coverage, the vendor said.

A license costs \$495 from Insurance Technology Consultants, Suite F, 1437 W. Palmyra, Orange, Calif. 92668.

Package Targets Canadian Payroll

MONTVALE, N.J. — Information Science, Inc. has announced a Canadian payroll processing feature for its payroll/personnel package for IBM's IMS and DL/1 and Software AG of North America, Inc.'s Adabas data base management systems. The package also runs under IBM's Vsam access method.

The Canadian payroll package is included as a no-charge option in the vendor's payroll/personnel packages. In addition, current users of the package who are subscribing to the vendor's maintenance program can get the Canadian payroll feature free, the vendor said.

The Canadian payroll package allows automated processing of various Canadian financial data including unemployment insurance, pension plans, the Quebec Pension Plan, federal and provincial taxes, nonpaid taxable benefits and vacation pay processing, the vendor said.

The vendor's payroll/personnel packages cost between \$50,000 and \$230,000, the firm said from 95 Chestnut Ridge Road, Montvale, N.J. 07645.

Mail, Filing System Runs Under RT-11

RICHMOND, Va. — Horizon Data Systems Co. has announced an electronic mail and filing system that runs under Digital Equipment Corp. RT-11 and S & H Software Computer Systems, Inc. TSX-Plus operating systems.

Quick-Mail supports a spectrum of applications including annotated file archives, tickler files, appointment calendars and electronic project notebooks, the vendor said.

The system is available for \$650 from Horizon Data Systems, 1901 Wildflower Terrace, Richmond, Va. 23233.



We're not big in OS software.



We're Giants.

Just because Computer Associates is the world's dominant DOS software company, maybe you thought we weren't much of a factor in OS software. The fact is, our very first product was developed for the OS system, and we've been developing OS software for over ten years.

We have a product line of OS packages that's positively gigantic, backed by awesome service capabilities.

Best of all, our software products are integrated — they can talk to each other. The benefit to you is far greater productivity than from any programs acting alone.

The integrated approach to diverse software has

made Computer Associates the pre-eminent systems software company in the world. We have over 13,000 satisfied customers, over 24,000 products installed, and over 50 OS/DOS and VM products combined — of which over 20 are designed specifically for the OS data center.

But just because we're big doesn't mean we're too big for our britches. We're ready and anxious to service even the smallest data processing department to help increase its productivity.

Take a giant step forward for your company. Contact your local CA Account Manager now. Or call 800-645-3003. In NY: (516) 333-6700.



COMPUTER ASSOCIATES

Computer Associates International, Inc.
125 Jericho Turnpike Jericho, New York 11753



I N T R O D U C I N G

EQUITABLE LIFE LEASING CORPORATION

- A new name • A new direction

(Formerly Equico Lessors)

We have a new philosophy, new headquarters and new services. At Equitable Life Leasing Corporation, we have the financial resources and expertise to meet all your leasing needs. We offer:

- Operating leases • Tax priced leases • Vendor lease programs

We are a subsidiary of

The Equitable Life Assurance Society of the United States, N.Y., N.Y.



For more information call any of the offices listed below

Atlanta

Building E, Suite 625
5775 Peachtree-Dunwoody Road
Atlanta, GA 30342
(404) 256-2434

Boston

40 William Street
Wellesley Hills, MA 02181
(617) 237-3660

Chicago

1111 East Touhy Avenue, Suite 340
Des Plaines, IL 60018
(312) 296-6030

Cincinnati

8160 Corporate Park Drive, Suite 200
Cincinnati, OH 45242
(513) 489-3900

Cleveland

5755 Granger Road, Suite 330
Cleveland, OH 44131
(216) 398-4800

Dallas

1320 Greenway Drive, Suite 225
Irving, Texas 75062
(214) 659-9730

Denver

Colorado Center, Suite P307
1777 South Harrison Street
Denver, CO 80210
(303) 761-3290

Detroit

6735 Telegraph Road, Suite 285
Birmingham, MI 48010
(313) 646-9333

Houston

6200 Savoy Drive, Suite 440
Houston, TX 77036
(713) 977-5761

Kansas City

Building 51, Suite 410
9393 West 110th Street
Overland Park, KS 66210
(913) 642-8450

Los Angeles

6615 E. Pacific Coast Highway, Suite 200
Long Beach, CA 90803
(213) 493-5431

Milwaukee

250 North Sunnyslope Road, Suite 340
Brookfield, WI 53005
(414) 785-9797

Minneapolis

7151 Metro Boulevard, Suite 175
Minneapolis, MN 55435
(612) 944-8740

New York

One Garret Mountain Plaza
West Paterson, NJ 07424
(201) 881-8200

Philadelphia

Merion Towle Building, Suite 204
1777 Walton Road
Blue Bell, PA 19422
(215) 628-0350

Phoenix

4561 East McDowell Road
Phoenix, AZ 85008
(602) 275-0194

Pittsburgh

Manor Oak One, Suite 540
1910 Cochran Road
Pittsburgh, PA 15220
(412) 343-8122

St. Louis

One Centerre Plaza, Suite 216
St. Louis, MO 63101
(314) 621-6732

Seattle

11058 Main Street, Suite 120
Bellevue, WA 98009
(206) 455-3723

San Francisco

The Alcoa Building, Suite 1200
One Maritime Plaza
San Francisco, CA 94111
(415) 982-0818

SUBSIDIARY

**EQUITABLE/OMNILEASE
CORPORATION**

San Diego

10251 Vista Sorrento Parkway, Suite 300
San Diego, CA 92121
(619) 453-0881

Boston

255 Bear Hill Road
Waltham, MA 02154
(617) 890-4000

Philadelphia

Merion Towle Building, Suite 101
1777 Walton Road
Blue Bell, PA 19422
(215) 646-6300

Silver Springs

8630 Fenton Avenue
Montgomery Center Building, Suite 621
Silver Springs, MD 20910
(301) 792-4833

CORPORATE HEADQUARTERS

10251 Vista Sorrento Parkway, Suite 300
San Diego, CA 92121
(619) 453-0881

Micro Notes

Formatted File Manager is a data base management system for the IBM Personal Computer and Personal Computer XT. Electronic forms identify a function to be performed and data that must be entered and a form may be generated to allow access to a data base. As many as 175 fields may be defined per form. Priced at \$225, the system runs on IBM's PC-DOS 1.1 with 128K bytes of memory and one double-sided, double-density disk drive or the Personal Computer XT with PC-DOS 2.0 and 192K bytes of memory. A \$70 report/sort option is also available through Exim Services of N.A., Inc., P.O. Box 5417, Clinton, N.J. 08809.

Softword Systems, Inc. has introduced **Multimate**, a function-key-driven system for documentation creation and modification. The software can be used with IBM's Personal Computer and Microsoft, Inc. MS-DOS operating systems and requires at least 128K bytes of random-access memory and two diskette drives. The software costs \$495 from 52 Oakland Ave. N., East Hartford, Conn. 06108.

Ellis Computing, Inc. has introduced **Nevada Fortran Revision 3.0** for Digital Research, Inc. CP/M operating systems. The compiler's features include chaining with name and blank common, IF-THEN-ELSE constructs, trace-style debugging, PEEK, POKE, 150 verbal error messages, arrays up to seven dimensions and random-access file support. The Fortran compiler generates Intel Corp. 8080 machine language. The software costs \$29.95 from Ellis Computing at 3917 Noriega St., San Francisco, Calif. 94112.

The Rapidata Division of National Data Corp. (NDC) has introduced **Calc-Plus**, designed to increase the scope of Calc packages. Calc-Plus Service links users of Visicorp's Visicalc and Supercalc to the division's remote-access host computers permitting utilization of NDC's

decision support software, network services and data communications capabilities, the vendor said. This service is available for Visicalc on IBM's Personal Computer and Apple Computer, Inc.'s Apple II+ and for Supercalc on the North Star Computers, Inc. Advantage computer. Prices are based on connect time, the vendor said through 20 New Dutch Lane, P.O. Box 1049, Fairfield, N.J. 07006.

Computer Tutor Corp. has announced a series of software-specific, self-teaching books with diskette for IBM's Personal Computer and Apple Computer, Inc.'s Apple II+ or IIe. Training courses in Lotus Development Corp.'s Lotus 1-2-3, Microsoft, Inc.'s Multiplan, Micropro International Corp.'s Wordstar and Visicorp's Visicalc and Supercalc are available. The price of each course is \$39.95 from Computer Tutor at 554 Washington St., Wellesley, Mass. 02181.

Cimarron Corp. has announced the **Insta** line of productivity software for Commodore Business Machines, Inc.'s 64 personal computer. The series consists of nine packages, which include the Insta-Writer, Insta-Mail, Insta-Calc, Insta-Vestor, Insta-File, Insta-Sched, Insta-Check, Insta-Graph and Insta-Speed. Package prices range from \$34.95 to \$99.95 and are available from 2158 S. Hathaway St., Santa Ana, Calif. 92705.

Geocomp Corp. has introduced **Geograph**, a software package to help create plots and graphs commonly used in business, science or engineering. The software is reportedly available using Digital Research, Inc.'s CP/M operating systems for Hewlett-Packard Co., IBM and Watanabe Instruments Corp. pen plotters. The price is \$250 from 342 Sudbury Road, Concord, Mass. 01742.

Burns & Associates has announced the **Version 8-System Activity Monitor** for

Microdata Corp.'s Reality and Sequel systems. The package includes user billing routines and real-time reporting and system usage. The monitor package operates with systems using 3.X firmware and operates under Version 3 or 4 of the Reality operating systems. The software is available under a single processor license agreement for \$450 through P.O. Box 451, Cincinnati, Ohio 45201.

Microq, Inc. has introduced **Finance 12Q**, a comprehensive financial software package for IBM's Personal Computer. The interface includes direct cursor positioning and data entry. It reportedly performs complex financial computations, including compound interests, cash flows and net present value. The price is \$129.95 from 3843 Plaza Drive, Fairfax, Va. 22030.

Micro Architect, Inc. has introduced **Exec-I** for IBM's Personal Computer and Personal Computer XT with two drives, and IBM's PC-DOS and monochrome display. The package includes seven applications: mailing list system, letter/memo system, record/inventory, check management system, stock security system, personal finance and appointment management. Available in a 64K-byte interpreter version and a 128K-byte compiled version, the Exec-I costs \$198 from 6 Great Pines Ave., Burlington, Mass. 01803.

Europro, Inc., has introduced **Edubas III**, a six-lesson program designed to teach the new features available in IBM's Basic 2.0. The programs require Microsoft, Inc.'s MS-DOS, or IBM's Personal Computer or PC-DOS-compatible operating system with at least one diskette drive, the color graphic adaptor and an 80-col. monochrome or color display. The

price is \$50 from 129 Saratoga, Petaluma, Calif. 94952.

Westminster Software, Inc. has introduced **Pertmaster**, a software package that reportedly lets users manage multiactivity projects using either the project evaluation and review technique or critical path analysis method. It is compatible with Digital Research, Inc.'s CP/M and MP/M, IBM's PC-DOS, and Microsoft, Inc.'s MS-DOS 64K-byte operating systems with rigid or floppy dual disk drives and printers with a line capacity of at least 132 characters. The price is \$695, including documentation from Suite 245, Building 4, 3000 Sand Hill Road, Menlo Park, Calif. 94025.

Why Systems, Inc. has introduced **Pro/Digicalc**. The software is a virtual memory spreadsheet designed for Digital Equipment Corp.'s PRO/350. Features include an easy entry system for information retrieval, three-dimensional consolidation where a number of worksheets can be summed together into a single spreadsheet and multitasking ability. The price is \$650 from 16902 Redmond Way, Redmond, Wash. 98052.

Graphwriter Communications, Inc. has introduced **Version 3.1 of Graphwriter**, a presentation graphics package for the IBM Personal Computer and Personal Computer XT. Support for the following three plotters is included: IBM's X/Y749; California Computer Product, Inc.'s Calcomp 84; and Enter Computer, Inc.'s Sweet-P. The price is \$395 from 200 Fifth Ave., Waltham, Mass. 02254.

SLR Systems has announced the **Z80 Assembly Language Development** package for Zilog, Inc. Z80-based microcom-
(Continued on Page 74)

DOS/VSE and CICS/VS Frustration?

BIM gets it out of your system.

BIM presents a line of proven programs that maximize your system's capabilities, saving you time, labor and expense. These program products help get the most out of your system and people.

- BIM-EDIT** — the editor with more than 25 significant features that ICCF can't match.
- BIMSPPOOL** — Prints output in POWER/VSE spooling queue on local or remote 3270 terminal printers. (Received ICP Million Dollar Award 1982).
- BIMSPPOOL** — On-Line to Batch Print Spooling. Prints data passed from CICS application programs into the POWER spooling queue.
- BIM-ODIS** — Comprehensive problem analysis and display of operational CICS system.
- BIMTEXT** — Word processing, document composition system. Create formatted documents from free-form input.
- BIMSWAP** — Switch local 3270 BTAM terminals between multiple CICS partitions without special hardware or additional ports.
- BIMCMPS** — CICS 3270 data compression system. Reduces response time for remote terminals significantly. Available for OS/VS1 and MVS also.
- BIMP3270** — Comprehensive CRT screen image print facility. Copy to terminal printers or spool queue for system printer.
- BIMSERV** — On-line display of library directories and entries, VSAM Catalog entries, disk VTOC's, etc.
- BIMDSLOG** — Console Message File display. Used by computer operations and programmers.
- BIMMONTR** — DOS/VSE System Status, Performance Measurement, and POWER Queue display.
- BIMDEVC** — Displays Logical Unit assignments for physical devices, to resolve operational problems.
- BIMSUBMT** — On-line Job Edit and Submission facility.

BIM programs are cost-efficient, many less than \$900. You can save even more with our group package offerings. Products are available on permanent, annual, or monthly leases, and shipped on a 30-day free trial basis. Product documentation is available on request.

BIM also performs systems programming consulting, with consultants based in Minneapolis and Washington, D.C. Computer time services are also available on our 4331-2 system, on-site or remote.

BIM

B I MOYLE ASSOCIATES, INC.
5788 Lincoln Drive
Minneapolis, MN 55436

612-933-2885
Telex 910-576-3137

Member Independent Computer Consultants Assn

4th Generation Language for the Personal Computer

NPL® The NonProgrammers NonProcedural Language

The NPL Information Management System lets an end user build applications without becoming a programmer.

In less than one day, you will:

- create database files of your own
- specify edit and validation tests
- 'paint' data entry screens
- select, sort and merge data records, and
- print simple and formatted reports

NPL is available on the following microcomputers: IBM-PC® & IBM-XT®, Apple® II & III, DEC Professional® 350 & Rainbow® and the Sage II ... soon on Victor® 9000, Burroughs B20, Hewlett Packard 9816.

If you like RAMIS II®, FOCUS® or NOMAD2® on big mainframe computers, you'll love NPL on a microcomputer ... the strong language similarity means zero training time.

The NPL System is an essential tool for your company's INFORMATION CENTER.

All for only \$950!

For more information, contact our Customer Services at 609/924-7111 or write:

DeskTop Software Corporation
228 Alexander Street, Princeton, NJ 08540

IBM PC & IBM XT are registered trademarks of International Business Machines, Inc., Apple II & Apple III are registered trademarks of Apple Computer, Inc., DEC Professional & Rainbow are registered trademarks of Digital Equipment Corporation. Sage is a registered trademark of Sage Computer Technology, Inc. Victor is a registered trademark of Victor Technologies, Inc. RAMIS II is a registered trademark of Mathematica, Inc., FOCUS is a registered trademark of Information Builders, Inc., NOMAD2 is a registered trademark of D & B Computing Services, Inc.



More good news for these Fortunate 500.

A. E. Staley	Boston Gas	Cullen Frost Bankers	Ing. F. Selmer	Memorex	PCA International	Servicios Interindustrias	University of Arizona
Alcoa Australia	Bowater	Dairyland Power	Inmont	Merck and Company	Peabody Coal	Servicios Liverpool	University of Calgary
Alcon Laboratories	Bramalea	Daan Development	Inspiration Consolidated Copper	Mercury Marine	Pepsico	Shaklee	University of Chicago
Allergon Pharmaceuticals	British Petroleum Australia	Dart and Kraft	Intecom	Mesa Petroleum	Perstarp	Shell	University of Colorado
Allied Bancshares	Brown and Root	Dekalb-Pfizer Genetics	Inter First of Texas	3M	Pertamina	Shulton Canada	University of Florida
Allied Chemical	Buckbee Meats	Delaite, Hoskins & Sells	InterNorth	Mabey Chemical	Peter Kiewit Sons	Sigma Motor	University of Georgia
Alusuisse	Burroughs	Delta Drilling	Interserra	Mobil Oil	Petra Canada	Signetics	University of Hawaii
Amdahl	Business School of Oslo	DePaul University	Iano College	Modern Merchandising	Petra-Lewis	Social Security Administration	University of Houston
American Bell	Cable America	Detroit Edison	ISCOR	Molson Companies	Petra Peru	Southern Methodist University	University of Idaho
American Can Company	Cajon Electric Power Cooperative	Digicon	ISS Data	Monsanto	Petroleum Corporation of	Southland Corporation	University of Iowa
American Cyanamid	Cal-Gas	Dillingham	I. T. E. S. M. Monterrey	Moog	New Zealand	Southwest Bancshares	University of Manitoba
American Financial	Caltex Petroleum	Dome Petroleum	ITT North Telecommunications	Multi National Investment	Phillips Petroleum	Southwestern Public Service	University of Massachusetts
American Hospital Supply	Cameron Iron Works	Dow Chemical	Jennings Industries	Murray Financial	Pigmentos Y Oxidos	Souza Cruz	University of Michigan
American Motors	Canadian Superior Oil	Dow Corning	Jones & Laughlin	Mutual Hospital Insurance	Pizza Hut	Sta-Rite Industries	University of Minnesota
American Natural Service	Canterra Energy	Drazen-Brubaker	Joseph E. Seagram & Sons	Nobisco Brands	Polaroid	Standard Bank Investment	University of Missouri
American Pharmaseal	Carnegie-Mellon University	Dresser Industries	Kansas City Power and Light	National Car Rental	Polysar	Standard Oil of California	University of Nebraska
American Telephone & Telegraph	Celanese	Dulux Paints	Kelsey-Hayes	National Semiconductor	Panderas Industrial	Standard Oil of Florida	University of North Carolina
American Ultramar	Central Sova	E. I. du Pont de Nemours	Kennecott Minerals	Natural Gas Pipeline	Portland General Electric	Standard Oil of Indiana	University of Texas
AMP Italia	CEPSA Petroleum-Spain	Duquesne University	Kentile Floors	Naturgas Syd	Price Waterhouse	Standard Oil of Ohio	University of Virginia
Anacosta	Cerveceria Cuauhtemac	Duval	Kimball International	NEBB Norway	Prime Computer	State of Louisiana	University of Wyoming
Anderson Clayton	CF Industries	Dyna Industrier	Komplek Kewangan	Newmont Mining	Public Service Board of	State of Texas	Urban Development Authority
Anglo American	Champlin Petroleum	Eastman Associated Coal	Kongsberg Vaapenfabrikk	NEUCC	New South Wales	State Nordiske Telegraf	U. S. Bancorp
Applied Power	Chocron	Eastman Kodak	Kreditkassen Bank	New Orleans Bank	Public Service Co. of Colorado	Strah Brewery	USC
ARCO	Chemplex Company	Echlin	Kruger Company	Nicar	Purdue University	Studsвик Energiteknik	USDA
Arizona Electric Power	China Light & Power	Ecole des Hautes Etudes	Kroy	New Zealand Industrial Gases	Quaker Oats	Sugar Bowl Gas	U. S. Fidelity & Guaranty
Arizona State University	Ciba-Geigy	Ecole Nazionale des Mines	Kvaerner Engineering	NKI Skalen	Racal-Milga	Superior Oil	USI Capital and Leasing
Arkla	Citicorp Acceptance Corp.	E. G. Leasing	Land-O-Lakes	Noranda Mines	Rainier National Bank	Syracuse University	U. S. Steel
Asesoria de Empresas	Citination Australia	Electra-Scientific Industries	Land-sarganisationen	Narcom	Ralston Purina Company	Technical Research Centre	U. S. Telephone
Asesoria Y Servicios GIS	City Utilities	Emerson Electric	La Quinta Motor Inns	Narges Handelshoejskalen	RCA	Technische Hochschule	Valero Energy
Ashland Oil Company	Clemente Jacques	Energy Cooperative	Leaseway	Narges Shiptais knings	Reading and Bates	Darmstadt	Valley National Bank
Askgaard Olesen	Clemson University	Energy Reserves Group	Lega Systems	Narske Olje	Ready Mix Concrete	Tenneco	Valeres Corporativos
Atlantic Richfield	Coastal Corporation	Engelhard Industries	Lend Lease, Ltd.	Narske Skag	Reliance Electric	Tesoro Petroleum	Vesta Hygoa
Austen & Butta	CODELCO	Environment Canada	Libbey-Owens-Ford	North American Coal	Rentca Europe	Texas A & M University	Vitra Corporativa
Bahrain Petroleum	COFIDE	Envirotech	Liberty Mutual Insurance	North Carolina Municipal	Republic Bank of Texas	Thomas and Betts	Valkos Group
Banco Nazionale Dell	College of William and Mary	E. R. Squibb & Sons	Lincoln Electric Systems	North Carolina University	Reserve Mining	Tiger International	Volkswagen of America
"Agricoltura"	Colonial Sugar & Refining	ESCOM	L. M. Berry	Northeastern University	Rice University	Tapeka Land	Vaught
Banco Itau	Colorado-Ute Electric Association	Especializados Tecnica	Lama Negra	Northern Trust	Rochester Telephone	Taranta International Airport	Warner Communications
Bank of Montreal	Columbia Gas System	Administrativos	London Transport Authority	Northwest Pipeline	Rockwell International	Tava Engineering	Weingarten Realty
Bank of Nova Scotia	Camalca	Formers Home Administration	Louisiana Land & Exploration	Norwegian Caribbean Lines	Rohm and Haas	Tracor	Welltech
Bankadati	Combustion Engineering	Farmland Industries	Louisville Gas & Electric	Narwegian Pulp & Paper	Rallins	Trane	Western Company of
Barclays Bank International	Commonwealth Industrial Gases	Farmas	Lowes Companies	Institute	Royal Baskalis Westminster	Trans-Canada Pipelines	North America
Batus	Canaca	FDB Sentralen	Magma Copper	Novo, an Alberta Corp	RUNIT Technical School, Norway	Transca Energy	Westinghouse
Bavaria	Consolidated Aluminum	First City Trust	Manitoba Data Services	Oak Industries	Rutgers University	Travenol Laboratories	Westpac Banking Corp.
B. C. Coal	Consolidation Coal	First Interstate Services	Manufacturers Hanover Trust	Ohio State University	Sabritas	Tricentral Oil	Wharton School
Beacon Oil	Consorcio Papelera Mexicana	First National Bank of Midland	Manufacturer's National Bank	Oklahoma Gas and Electric	Sade	Trilogy Systems	White Martins
Bebedos Mundiales	Container Corporation of America	Fisher Price Toys	Mapco	Omega Barfel	Salamon Brothers	Triumph Adler	Wihl. Wilhelmssen
Bechtel Power	Contel Data Services	Florida State University	Marine Midland Bank	Ontario Hydro	Samaritan Health Service	Tulane University	Williams Companies
Bechtel Dickinson	Continental Illinois National	Fluor	Mark Producing	Ontario Ministry of	Santas Ltd.	UCLA	Wilson Learning
Bell Labs	Bank	FMC	Marquette University	Government Services	Sao Paulo Alpagatas	Ultramar Canada	Wimpey of Canada
Bell of Pennsylvania	Central Data	Ford	Marriott Corporation	Owens-Corning Fiberglas	SAS Catering	Ultramar Golden Eagle	Woods Gordon
Bergen Bank	Cooper Tire and Rubber	Fria Loy	Marsh and McLennan	Pace Financial Management	Saskatchewan Oil and Gas	Unibanco	W. R. Carpenter
Best Products	COPEC	Functionality Group	Mary Kay Cosmetics	Pacific Resources	S. C. Johnson and Son	Unicarb Industrial	W. R. Grace
B. F. Goodrich	Corporativa Coral	Fundidora Monterrey	Matro Horis	Packaging Corporation of	Seafirst Leasing	Union Bank	Xerox
Boral	Catanifica Cantani	F.W. Woolworth	McGraw Edison	America	Seattle First National Bank	Union Carbide Corporation	
Boregaard	Cox Enterprises	Gaffney, Cline & Associates	McGraw Laboratories	Pan Canadian Petroleum	Serma	United Breweries	
Boston College	Cray Research	Garrett Automotive Products	McKinsey and Company	Panhandle Eastern Pipe Line	Service Merchandise	Universidad de Chile	
	Cryovac	Gas Research Institute	Mead Corporation	Paris Chamber of Commerce	Servicios Corporativos	Universita di Padova	

Introducing IFPS/Personal. Decision Support System software uniting personal computers with mainframes.

Users in the organizations listed here can now achieve an unprecedented level of problem solving and decision-making support.

These companies already have the Decision Support capabilities of mainframe IFPS. With IFPS/Personal, they can extend those capabilities to the desktop. IFPS/Personal uses the same standard modeling language as mainframe IFPS—a language that lets managers describe complex business problems in their terms, not in technical jargon.

IFPS/Personal is the first DSS software package optimized for the personal computer, and we give it the same level of support our mainframe users enjoy now. That means that no other DSS software is better suited for the Information Center.

Become one of the fortunate 500. Call or write us today. Execucom Systems Corporation, 3410 Far West Boulevard, Austin, Texas 78766. **1-800-531-5038** or in Texas and Canada call 512-346-4980.



Micro Notes

(Continued from Page 72)

puters utilizing Digital Research, Inc.'s CP/M operating system. The package consists of Z80 ASM, a relocating macro assembler and SLRNK, its companion linking loader. The price is \$169.95 plus \$30 for the manual from 1622 N. Main St., Butler, Pa. 16001.

Peachtree Software, Inc. has announced the release of a version of its **Business Graphics System** for the IBM Personal Computer and Zenith Data Systems, Inc.'s Z-100 microcomputers. Written in Peachtree Graphics Language, the software enables the user to design charts and graphs using input from the screen or from financial modeling packages such as Peachtree's Peachcalc and VisiCorp's Visicalc and Supercalc. The system also supports Epson America, Inc.'s MX80 or MX100 printers, the IBM Personal Computer printer, Hewlett-Pack-

ard Co.'s 7220 and 7470 plotters, Bausch & Lomb Houston Instrument Division's DMP series plotters and Strobe, Inc.'s S-100 plotter. The price is \$295 from 3445 Peachtree Road N.E., Atlanta, Ga. 30326.

The Computer Company has announced the APL68000 interpreter for Altos Computer Systems, Inc.'s ACS68000 Models 12 and 14, Cyb System, Inc.'s Multibox models and Sord Computer Corp. of America's M68 PC model. The price is \$2,000 each for the Altos and Cyb systems from 1905 Westmoreland St., Richmond, Va. 23230.

Silicon Valley Sstems, Inc. has introduced the **Handlers**, a word processor software package that includes the Word Handler and the List Handler for users of Apple Computer, Inc.'s Apple II, II+, IIe or Franklin Computer Corp.'s Ace computers. The Word Handler's major fea-

ture allows the user to see on-screen what the final printout will look like. The List Handler is a filing management program which has a storage capacity of up to 3,000 records on one disk. The Handlers package is priced at \$89.95. The Word Handler costs \$59.95 and the List Handler costs \$49.95 from Suite 4, 1625 El Camino Real, Belmont, Calif. 94002.

Emerging Technology Consultants, Inc. has introduced **Offix**, an office document system for the IBM Personal Computer. The system integrates electronic filing functions, word processing, form design and report generation. The software requires Microsoft, Inc.'s MS-DOS operating system and costs \$99 from 2031 Broadway, Boulder, Colo. 80302. This product will be available by the first quarter of 1984, the vendor said.

Taurus Software Corp. has announced

the release of **CPplus V2.0** for users of IBM's Personal Computer. CPplus consists of a computer-aided instruction tutorial on the basic operations of a personal computer, an English-language front-end interface, and a package of file management utilities. The software is available for IBM PC-DOS, selected Microsoft, Inc. MS-DOS and selected Digital Research, Inc. CP/M 80 and CP/M 86 operating systems. The price for the 16-bit version is \$200, and the 8-bit version is \$150 from 3685 Mount Diablo Blvd., Lafayette, Calif. 94549.

Business & Professional Software, Inc. (BPS) has announced a new version of **Business Graphics** for the IBM Personal Computer and the Personal Computer XT.

The software adds new graphics features, which include new area fills, support for additional printer/plotter output devices and disk-based instruction tutorials, to the earlier BPS software.

Required hardware includes 128K bytes of main memory and, for the standard IBM Personal Computer, at least two double-sided disk drives.

Business Graphics costs \$350 from 143 Binney St., Cambridge, Mass. 02142.

Data Processing Design has announced **Word-11**, a word processing system for users of the Professional 350 personal computer system from Digital Equipment Corp.

The software includes features to create, edit and print interactively a variety of documents ranging from letters and reports to contracts and technical manuals. Specialized printing functions such as overstrike, superscript, subscript, proportional spacing and use of multiple character sets are supported for most printer types.

It is available for \$745, which includes list processing and spelling error detection, or for \$595 without full-feature configuration from Suite F, 181 W. Orangethorpe, Placentia, Calif. 92670.

An integrated software package for the IBM Personal Computer XT equipped with 128K bytes of memory and hard disk capacity of 10M bytes or more, **Printing Software Management Package** reportedly provides small to medium graphics arts firms with the ability to do estimating, job costing, inventory control, job scheduling and other management functions. Prices start at \$3,000 from Printers Software, Inc., 933 Rt. '23, Pompton Plains, N.J. 07444.

Televideo Systems, Inc. has announced **Telesolutions II**, a kit containing three software packages for both its TS 803 and TS 1603 personal computers. Containing word processing, spreadsheet and integrated software packages, the kits are priced at \$795 for the TS 803 and \$595 for the TS 1603. More information is available from 1170 Morse Ave., Sunnyvale, Calif. 94086.

A "Basic Algorithms" Micro Chart has been introduced by Micro Logic Corp. The two-sided 8½-in. by 11-in. plastic reference sheet has algorithms written in "minimal" Basic including four ways to sort. Each algorithm is accompanied by its function, advantages, speed and method.

The cards cost \$5.95 each plus \$1 total postage through P.O. Box 174, 100 Second St., Hackensack, N.J. 07602.

Software Fitness Program is a set of interactive accounting applications for single and multiple users of Victor Technologies, Inc.'s Victor 9000 personal computer operating under Microsoft Corp.'s MS-DOS. Including accounts receivable, accounts payable, general ledger, inventory, payroll and other applications, the package is being marketed through Victor 9000 distributors for a suggested list price of \$695 per application by Open Systems, Inc., 430 Oak Grove, Minneapolis, Minn. 55403.

Will the Japanese succeed in altering the balance of WORLD COMPUTER POWER?

Technology Transfer Institute presents a one-time opportunity to join . . .



Edward Feigenbaum



James Martin

with 12 world authorities on knowledge-based systems, artificial intelligence, and computer systems architecture including:

- Koichi Furukawa
- Frederick Hayes-Roth
- Edward Fredkin
- Michael L. Dertouzos
- H. Penny Nii
- Takeo Kanade
- David Shaw
- Samuel Fuller
- Ralph E. Gomory
- Nils J. Nilsson
- Pamela McCorduck
- Bruce Delagi

A 4-day seminar

Washington, D.C.
November 7-10, 1983



Knowledge-Based Systems and the Fifth Generation

We are now at the dawn of a new computer revolution!

The American computer industry has been innovative, vital, and successful. Today we dominate the world's ideas and markets in this most important of all modern technologies. But what about tomorrow?

The Japanese have their sights on becoming number one in the industry by the latter half of the 1990s. They aim to dominate the computer industry by establishing a "knowledge industry" in which knowledge itself will be a saleable commodity.

The Japanese have both strategy and tactics. Even partially realized concepts that are superbly engineered can have great economic value, preempt the market, and give the Japanese the dominant position they seek.

Are we about to blow it again?

Remember our complacency toward Japanese initiatives in other technologies? In the '60s small cars, the '70s consumer electronics, today half the world market for the most advanced memory chips! The Japanese vision is clear: a major market share of the computer industry in the 1990s.

America invented this technology. If we focus our efforts we should have little trouble in dominating the second computer age as we dominated the first. America needs a national plan of action for the knowledge systems of the future . . . NOW.

Technology Transfer Institute has gathered together the foremost thinkers in the field of knowledge-based systems, artificial intelligence, and new computer systems architectures. They will describe the current technology, what the Japanese Fifth Generation Project is really trying to accomplish, what we can do in the immediate future, what the risks are for not following through, and what impact future knowledge systems will have on our work, our lives, and our technology.

For further information send the coupon or call

**TECHNOLOGY
TRANSFER
INSTITUTE**

at (213) 394-8305

Please rush information on the 5th Generation Seminar.

Name _____

Company _____

Address _____

City/State/Zip _____

Phone _____

CW 9/26

Mail to: Technology Transfer Institute
741 10th Street / Santa Monica, CA 90402

Inside every RAY-O-VAC Battery there's a NATURAL current.



NATURAL Fourth-Generation Information Processing System

There's hardly a humanoid in sight who doesn't depend on Ray-O-Vac batteries for consistent, dependable power.

And there's hardly a programmer at Ray-O-Vac who doesn't depend on Software AG's NATURAL for the power of a fourth-generation application development system.

NATURAL combines an advanced non-procedural language with a range of other features that raise programmer productivity to unprecedented levels—typically 10 to 30 times the productivity of COBOL.

NATURAL's easy to learn, both for experienced staff and for end users. And NATURAL comes ready to work with Software AG's other powerful software tools:

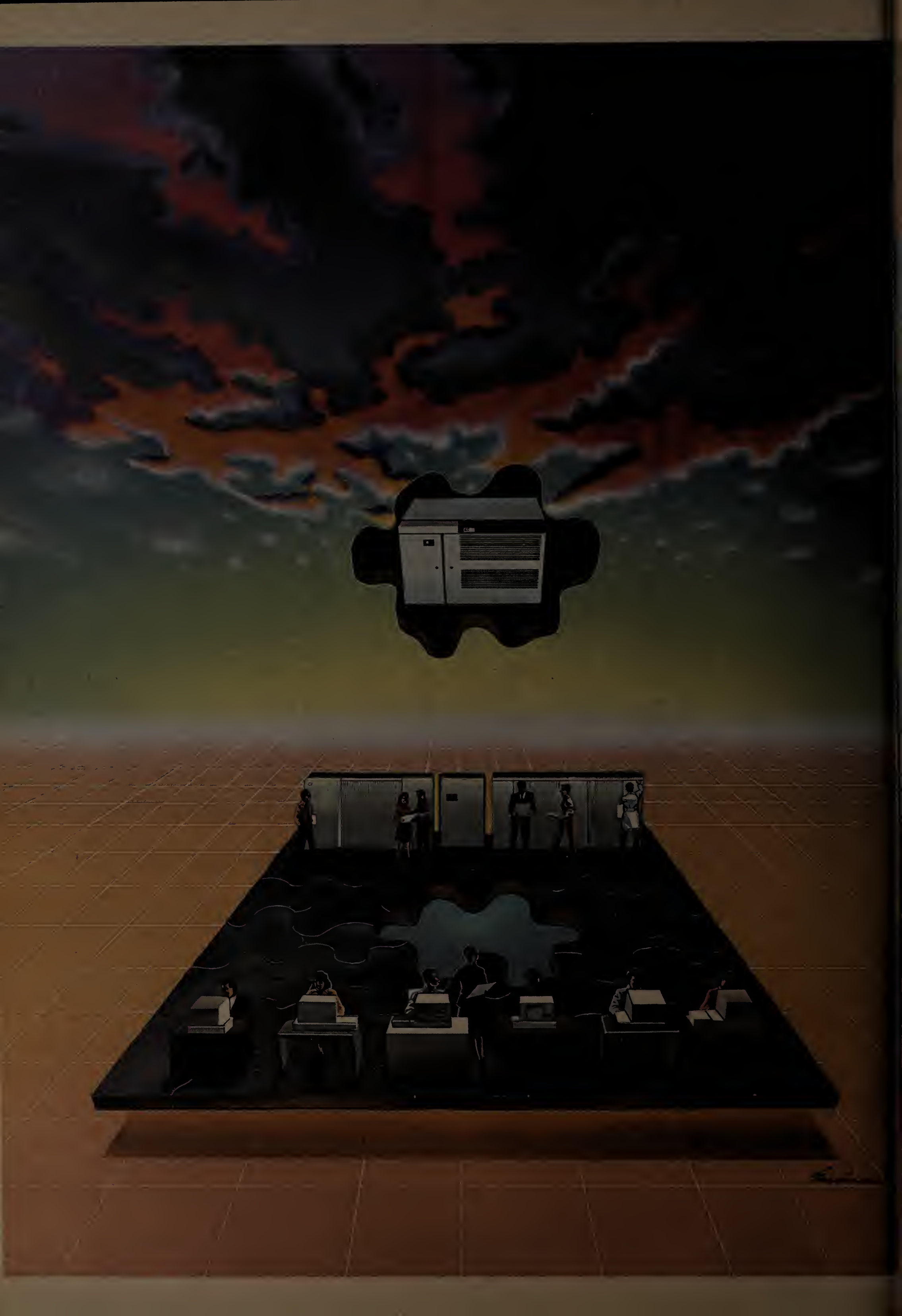
- ADABAS, the data base management system that's brought the benefits of relational architecture to hundreds of worldwide users;
- COM-LETE, an online teleprocessing system with its own battery of powerful program development facilities;

- NET-WORK, a series of tools to turn the promise of distributed processing into a reality; and
- PREDICT, the first data dictionary specifically designed for the fourth-generation application development environment.

With this combination of capabilities behind it, no wonder NATURAL has the largest installed base of any fourth-generation application development system in the world. So whether your business is androids or alkalines, you owe it to yourself to see what NATURAL can do to help you keep current.

Software AG of North America, Inc.
11800 Sunrise Valley Drive,
Reston, Virginia 22091
(703) 860-5050

Copyright 1983 ADABAS, NET-WORK, NATURAL and PREDICT are trademarks of Software AG of North America, Inc.



Introducing the MidFrame™ Computer.

Layered intelligence gives you the best of batch and interactive. Without the tradeoffs. Or trade-ins. A perfect fit!

TSO without the overhead.

Now there's an economical, trouble-free way to build advanced interactive processing into your mainframe environment: the DIALOGIC/ONE™ MidFrame System.

The MidFrame uses a unique layered approach for optimizing mixed workload processing—batch on the mainframe, and interactive on the DIALOGIC/10™ Computer. While functions are physically distributed, they're integrated transparently into the MVS/TSO environment to create a single system image.

This lets you really manage your resources. And add capabilities you've been wanting. Without the drawbacks.

Double interactive throughput.

The MidFrame provides consistent *sub-second* response time for about half the usual per-user cost. Think what this does for productivity! Development lead times and labor costs can shrink dramatically. Add to that the accelerated return on your applications investment and you've saved a tidy sum.

Or extend your mainframe's life.

If CPU capacity is a problem, the MidFrame offers an easy, economical alternative to costly upgrades. That's

because you can off-load up to 50 percent of your interactive program development work-

load to the MidFrame. And overall performance will improve as a result.

Boost productivity with powerful software tools.

The MidFrame provides capabilities never before found in mainframe shops.

Things like knowledge-based editors that "know" just what to do. Without being told!

And functions for compound searches. Undo/redo too. Plus a powerful, consistent command language that is easily expanded.

You also get sophisticated window management—with multiple split screens—for simultaneous processing and tracking of multiple activities. There's even host-compatible electronic mail.

To really put a dent in backlogs, there's our smart COBOL editor. With automatic syntax checking. Cross-referencing. Formatting. Scanning. Zooming. And more.

Coming soon are more interactive applications for both DP professionals and business users. Including an application language for the MidFrame that even novices can use.

Nothing to lose.

Users retain full, unobstructed access to all TSO facilities—including MVS data sets/files—via an ISPF-like user interface that virtually eliminates retraining. Other VTAM applications are available in passthrough mode. Of

course, security and data integrity are maintained throughout the system.

Evolutionary growth path.

With the MidFrame, you can grow without penalty. Just add functions, terminals or interactive stations as needed. And

when new technologies emerge, the MidFrame will be in the middle of them too. Because its generation-ahead design provides a *real* migration path.

Unsurpassed performance and reliability.

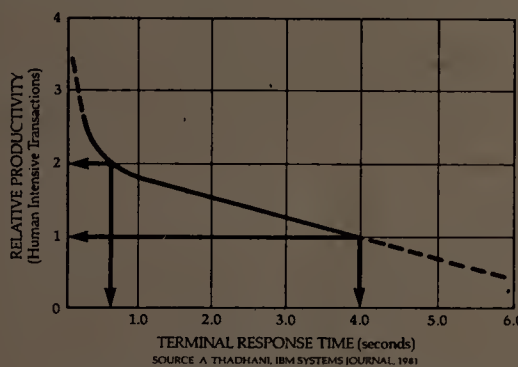
Powered by multiple

Motorola 68000s, the MidFrame also has an integrated 400 MB disk memory. Local/remote SNA support is built in. Operating software requires no MVS code modifications.

Sophisticated diagnostics and fault correction assure data integrity. Redundant components keep everything running smoothly even during maintenance operations.

Find out how a MidFrame can bring your mainframe up to speed.

For detailed information contact Dialogic Systems Corporation, 1335 Bordeaux Drive, Sunnyvale, CA 94089 (408) 745-1300. Continental U.S.: (800) 831-8011, California: (800) 227-1445.



IBM studies show how improving response time boosts productivity.



MidFrame, DIALOGIC/ONE and DIALOGIC/10 are trademarks of Dialogic Systems Corporation

The means that justifies both ends.



SAS, Not Just for IBM

...Anymore

Since its beginnings, SAS® has provided a powerful and flexible software system to IBM users. Now SAS offers VAX™, ECLIPSE® and PRIME® users the same power and flexibility.

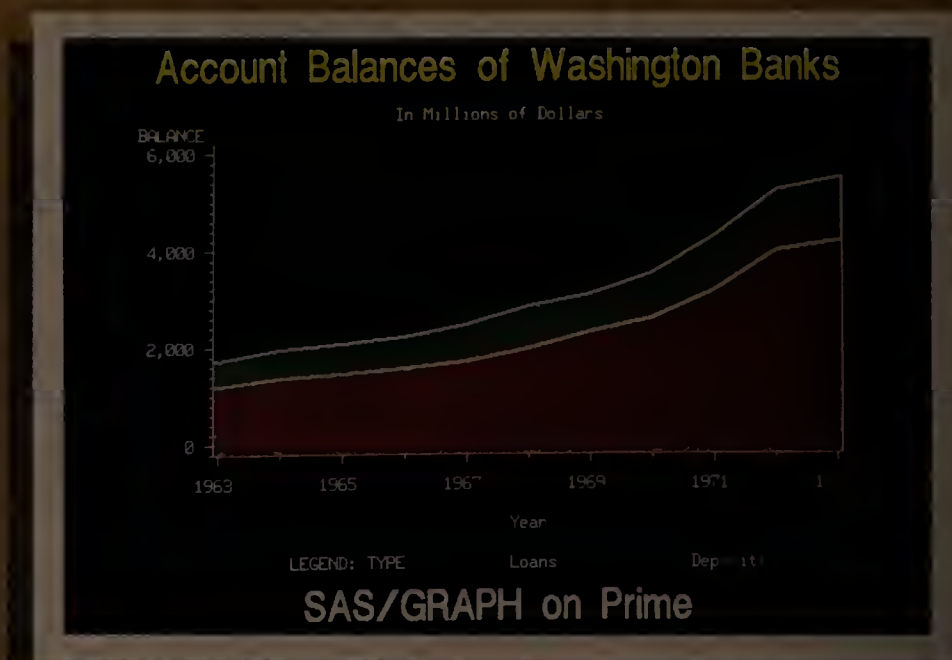
You get a twofold advantage with the SAS System. A library of ready-to-use procedures gives you the power to analyze data without formal training. SAS even provides an on-line help facility. With a few English-like commands, you can use SAS for data analysis, market research, capacity planning, financial reports, summary statistics, charts, plots, personnel reports and many other jobs.

In addition to these routine reports, the SAS System provides extensive data management and retrieval tools, combined with a macro facility, to handle all your complicated programming needs.

In short the SAS System gives you the analytical tools for a complete Decision Support System, integrating SAS for data management, statistical analysis and report writing; SAS/GRAPH™ for color graphics; SAS/ETS™ for econometric and financial modeling, and forecasting; and SAS/FSP™ for data entry, letter writing and financial spreadsheet reporting.

Now you can enjoy the power and flexibility of mainframe software on a minicomputer — with SAS.

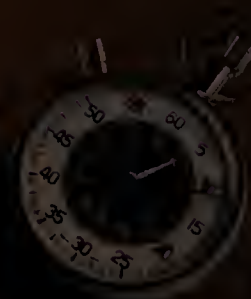
Call or write today. SAS Institute Inc., SAS Circle, Box 8000, Cary, NC 27511 USA. Telephone (919) 467-8000. Telex 802505.



SAS Institute Inc.
Hollis Road, Raleigh, NC 27606
Telephone (919) 467-8000 Telex 802505

SAS Institute Inc.
The College of William & Mary
P.O. Box 8000, Williamsburg, VA 23186
Telephone (804) 251-1111 Telex 802505

SAS Institute Inc.
1001 University Ave., Suite 100
Cary, NC 27511 Telephone (919) 467-8000 Telex 802505



Two Services Announced by Sita At Conference

By Katherine Hafner
CW Staff

NEW YORK — Sita, the telecommunications and information service for major airlines throughout the world, held its first North American conference here recently, with 162 attendees representing 75 different carriers from North and Central America.

In addition to providing a two-day informational forum for Sita members, the conference served as a launching pad for two announcements:

- An agreement with the Los Angeles International Airport (LAX) for a shared terminal system in that airport's new West Terminal.
- The automation of TIM, the travel information manual published monthly to provide travelers with passport, visa and vaccination information.

Sita, a nonprofit organization owned cooperatively by 248 airlines around the world, coordinates telecommunications for its members using nine centers around the world that serve 950 cities in 154 countries. Sita's facilities are used for every facet of the airline industry, from on-line reservations to baggage tracing.

Depending on the size of the member airline, Sita can either act as the airline's sole network or work in conjunction with an airline's private network when communications demands reach beyond the network's capabilities.

The plan for shared terminals at LAX, to be implemented by April 1984 in time for the Olympics, would allow the airlines occupying the new West Terminal to overflow to adjacent check-in counters during peak hours, according to Philip Freeman, British Airways' North America telecommunications manager.

At the new LAX wing, each airline will be allocated five terminals for its check-in counter. Assuming one carrier's peak period is another's slack time, Freeman said, an extremely busy airline can spill over to the next counter, where terminals would otherwise stand unused, and double their processing capability.

(Continued on Page 84)

Northern Telecom Unveils Enhancements to SL-1 PBX

NASHVILLE, Tenn. — Northern Telecom, Inc. has announced a series of new products and enhancements said to increase the data handling capabilities of its SL-1 digital private branch exchange (PBX).

The announcements introduce enhanced versions of the SL-1, IBM 3270-related capabilities, options designed to permit direct digital communications with other compatible switching systems or computers and a store-and-forward voice messaging service integrated with the SL-1 system.

Beginning in the first quarter of 1984, the SL-1 family will comprise the SL-1M, serving from 40 to about 300 lines, and the SL-1N, serving up to 840 lines in a nonblocking configuration. The SL-1 will also comprise the SL-1XN, serving up to 3,000

lines, virtually nonblocking.

The SL-1N can support up to 1,500 lines and the SL-1XN up to 5,000 lines for users with lower traffic capacity requirements, a vendor spokesman said. All versions of the SL-1 are priced at approximately \$1,000/line.

An IBM 3270 emulation feature for the SL-1 is said to permit most Ascii asynchronous terminals to operate as IBM 3270-type, on-line terminals.

A protocol conversion unit allows up to seven asynchronous terminals to be connected to various mainframe computers through the SL-1, a vendor spokesman said. A seven-port conversion unit will be available for \$7,000 in the first quarter of 1984.

Two devices, a computer-to-PBX inter-

(Continued on Page 80)

For City-to-City Service

NY State Inks Telephone Pact

By David Myers
CW Staff

ALBANY, N.Y. — Declaring "bypass" a dirty word, the New York state government has found a way to get cheaper city-to-city telephone service without entan-

gling itself in a complicated phone system to avoid the telephone company's local loop.

The state's Office of General Services here has inked a five-year \$6.8 million contract with Syracuse, N.Y.-based Eastern Microwave, Inc. for voice-channel service between Albany and three other New York cities — Buffalo, Syracuse and the Big Apple.

State Director of Telecommunications John T. Heinsohn told *Computerworld* in a recent interview that the microwave service would save the state \$3 million a year on government-business phone calls.

He said Eastern Microwave is charging \$2.6 million less than New York Telephone, the state's Bell operating company — "and that's before New York [Telephone's] proposed rate increase," Heinsohn added.

The contract between Eastern Microwave and the state freezes rates for five years. By contrast, a state planning study predicted the breakup of AT&T would force New York to shoulder annual rate increases from Ma Bell, easily doubling its phone costs.

Eastern Microwave, the 19-year-old-

(Continued on Page 80)

Package Allows DEC, Sperry Communication

LITTLETON, Colo. — Electron Information Systems has announced its Asynchronous Telecommunications Software Package said to enable microcomputers running the Digital Research, Inc. CP/M system to communicate with Sperry Corp. 1100 mainframes.

The software allows for file transfer of standard Ascii data, or the user may select a conversational mode to interface with the Sperry. Handshaking takes place at 300 to 1,200 bit/sec via standard cabling or dial-up telephones, a spokesman said.

The package is available for \$795 from Electron Information Systems, 5554 S. Prince St., Littleton, Colo. 80120.

CLIP AND RETURN FOR FAST RESPONSE

300 BAUD

103A COMPATIBLE



MODEL 305E2-12

\$147

MODEMS

WITH ALL THE FEATURES YOU NEED

FULL DUPLEX EIA RS232C INTERFACE

INTEGRAL VOICE / DATA SWITCH ALLOWS USE WITH ANY MODULAR TELEPHONE

CAN BE USED ON DIAL NETWORK OR TWO WIRE PRIVATE LINES

212A HAS MANUAL ORIGINATE / ANSWER SWITCH; 103A IS ORIGINATE ONLY

1200 BAUD

212 A COMPATIBLE



MODEL 212E2-32

\$377

- ☐ Acoustic Couplers
- ☐ Models
- ☐ Line Drivers
- ☐ Accessories
- ☐ Statistical Multiplexers
- ☐ Protocol Converters

Please check items of interest and return to us for additional information

COMDATA
We can get you there from here.

7900 N. Nagle
Morton Grove, IL 60053 New York Los Angeles
312/470-9600 212/690-7727 213/622-0334

member of
IDCMA

name _____
company _____
street _____
city _____ state _____ zip _____
telephone _____ ext. _____

N.Y. Inks Pact for City-to-City Telephone Service

(Continued from Page 79)

closely held subsidiary of Newhouse Broadcasting Corp., is providing microwave dishes and direct-voice cable connection to the Honeywell, Inc. tandem switching facilities already owned by the state.

"It's not really bypass — that's become an ugly term in government circles — because we're not buying it. We're getting it from a common carrier. The state doesn't want to be in the business of running its own system," Heinsohn said.

Eastern Microwave is regulated by the New York Public Service Commission, and because of that it has to offer "the same deal" — a five-year fixed rate — to other customers who want it, said Arthur F. Perkins, the

'It's not really bypass — that's become an ugly term in government circles — because we're not buying it. We're getting it from a common carrier. The state doesn't want to be in the business of running its own system.' — John Heinsohn, director of telecommunications, New York state.

company's general manager.

AT&T Long Lines, the Bell System's long-distance arm, could not afford to offer New York state a five-year deal because "then they'd have to offer it to everybody else," Perkins said.

A spokesman for AT&T said the firm had not bid for the contract, but he would not comment further.

According to Perkins, "We charge [the state] what we'd charge anybody

else. Somebody who buys a 60-channel block from us will get the same price. The state didn't get a break."

For its part, the Syracuse company was willing to risk five years of fixed rates for the chance to break into user areas it otherwise might not have been able to crack, Perkins said.

New York first doled out \$4.5 million for its 1,500-trunk Honeywell tandem switches when AT&T was unable to finish an electronic tandem

network for the state, Heinsohn said.

"That was a forerunner of our efforts to meet the challenge of AT&T's divestiture," Heinsohn said. The state signed its first contract with Eastern Microwave, for 240 channels of Albany-to-New York service, in February 1982. The 300 new links, from Albany to Syracuse and Buffalo, are expected to be handling government business by the first quarter of next year.

Although the state owns the switching facilities and Eastern Microwave is providing the dishes and point-to-point dial tone, New York Telephone's equipment and public lines are doing the rest.

A spokesman for New York Telephone said the phone company did not resent Eastern Microwave's piggybacking on its equipment.

"That's how MCI [Communications Corp.] got started. They're using existing network facilities. But it also opens up things for us. It provides a lot more options," the phone company spokesman said. However, he would not be more specific.

Enhancements Said to Boost SL-1 Capabilities

(Continued from Page 79)

face and a digital trunk interface have been introduced to help users reduce data communications costs, a vendor spokesman said.

The computer-to-PBX interface is built into the SL-1 system and permits economical data communications from computer terminals, through the SL-1, to a compatible computer over standard telephone wiring or other standard transmission media.

The interface specification is based on the T-Carrier standard digital transmission rate adopted for the North American Public Telecommunication Networks based on a 1.54M bit/sec channel that can reportedly be subdivided into smaller units. A 24-channel interface device will be available in the second quarter of 1984 for \$4,000.

The digital trunk interface, using circuitry similar to the computer-to-PBX interface, permits the SL-1 to transmit voice and data information in digital format directly to a compatible central office telephone switch, another SL-1 or a Northern Telecom SL-100 Business Communications System. A 24-channel digital trunk interface device will be available in the second quarter of 1984 for \$4,800.

The SL-1 Integrated Voice Messaging System (IVMS) is based on an adaptation of the Commterm, Inc. EVX-1000 voice messaging system.

The IVMS allows any caller to leave a message without having to learn complex procedures or to know special access codes, a vendor spokesman claimed. Suggested price ranges from \$82,000 for a 200-user system to \$150,000 for a 1,000-user system. First deliveries are expected in the first quarter of 1984.

More information is available from 1001 Arapaho Road, Richardson, Texas 75081.

PROJECT:

MANAGEMENT INFORMATION SYSTEMS



PLAY A KEY ROLE

Help develop Business Application Systems for technology leader Hughes Aircraft Company and its Space & Communications Group near LA Airport.

Our MIS Department has excellent opportunities open for senior-level individuals with experience (at least five years preferred) and knowledge in:

- Project planning
- Conversion from IBM to HP
- System Development Life Cycle, and
- The following: OS/VS (MVS), JCL, TSO, COBOL, HP3000 (44/64), IMAGE, IDMS, and utilities.

Salaries are highly competitive. Benefits range from family vision-care and dental coverage to full

reimbursement for continuing your education.

For further information, please feel free to call collect: Phil Davenport, Manager, Management Information Systems, (213) 414-7609.

Or mail your resume to: Lorraine Marcone C2/C162, Hughes Aircraft Company, Space & Communications Group, Employment 40-33, Dept. WC-813, P.O. Box 1042, El Segundo, CA 90245.

Proof of U.S. Citizenship Required
Equal Opportunity Employer

Creating a new world with electronics

HUGHES
HUGHES AIRCRAFT COMPANY

SPACE & COMMUNICATIONS GROUP

Innovative Information Retrieval Systems by Pansophic

Leading The Industry With Over 4,500 Satisfied Customers.

If you're looking for information retrieval software, come right to the source. Pansophic introduced the first retrieval software product of its kind in 1973, and has been at the vanguard of the industry ever since.

From simple reports to applications programming... Pansophic offers terminal-based products for virtually any reporting requirement. Our retrieval systems provide your company with the flexibility and sophistication your data center needs... and the ease-of-use that your corporate users demand.

Compare our long list of innovative features with competitive software products, and decide for yourself. Our retrieval systems feature a full-screen interactive prompt and an interactive compiler with an ISPF-like language-sensitive editor (the first available in the industry). Prompt and free-form modes allow you to tailor your session to your level of expertise, and maximize your productivity in the on-line environment... be it CMS, TSO, or CICS, while offering interactive report execution. Most importantly, our extensive HELP/TUTORIAL facilities will never let you go astray.

To access corporate data and create reports in a minimum amount of time (even those requiring special formatting), Pansophic has the product. In fact, our retrieval systems also allow you to copy and repair files, create extract files, update files, and process unlimited files automatically. These valuable tools are even being used for applications development in many installations.

Our extensive user base of over 4,500 customers around the globe attests to the vast acceptance of our retrieval software. Our reputation is further enhanced by the conscientious support, service, active user-groups, and award-winning documentation that accompany each of our products.

We invite you to compare Pansophic with other retrieval products... and see the difference ten years of leadership can make. Send in the coupon below, and we'll be pleased to send you more information on our award-winning retrieval software.

Yes, Pansophic—I would like to know more about your Information Retrieval Systems.

Please: ☐ Send more information.
☐ Have a Sales Representative contact me.

Name

Company

Address

City

CPU[s] installed

Operating System

Title

Telephone

State

Zip

CW 9/26

MAIL TO: Pansophic Systems, Inc., 709 Enterprise Drive, Dept. C612
Oak Brook, Illinois 60521. 1-800/323-7335. In Illinois 312/986-6000.

PANSOPHIC®

Multifunction Board Fits IBM, TI Micros

SUFFERN, N.Y. — Microlog, Inc., a subsidiary of Terminal Unlimited International, Inc., has unveiled a processor-controlled communications upgrade for the IBM and Texas Instruments, Inc. personal computers.

Babytalk, which also fits other brands of bus-compatible computers, is a multifunction board described by Microlog as capable of handling communications and data management tasks as background operations while the host processor performs foreground functions.

Babytalk is priced at \$895 from Microlog at 222 Rt. 59, Suffern, N.Y. 10901.

Videotex Service Unveiled

WILTON, Conn. — A North American presentation level protocol syntax (NAPLPS)-based, business-to-business, advertiser-supported videotex service has been announced by Videotex Information Corp. (VI).

Videolog is a catalog for the electronics industry that will be expanded in 1984 to include an on-line directory

For Apple Micros

Modem, Software Package Out

NORCROSS, Ga. — Hayes Microcomputer Products, Inc. has announced a modem and communications soft-

ware package, the Micromodem II and Smartcom I, for Apple Computer, Inc. products.

The Micromodem II provides AT&T's Touch-Tone dialing, pulse dialing, a speaker and support for both single-line and multiline connections. It operates with Apple Computer, Inc.'s Apple II, II+, IIe and III computers.

The Smartcom I program directs the modem to place and answer computer calls and to send and receive files with any of three file trans-

fer protocols. The software operates under Apple's DOS 3.3 and Digital Research, Inc.'s CP/M operating systems.

The Micromodem II communicates over telephone lines at 300 and 110 bit/sec, and is compatible with any Bell 103-type modem.

The software package costs \$329. Current owners of the Micromodem II may purchase Smartcom I separately for \$119, the vendor said from 5923 Peachtree Industrial Blvd., Norcross, Ga. 30092.



Russ Kelly, DP Mgr., Steel Heddle, Greenville, S.C. says...

...Be A Mail Wizard

From one DP Manager to another... "let me tell you about a complete electronic mail system, WIZARD MAIL™, that has some extraordinary features—business oriented, flexible, secure, doesn't cost a fortune and has a money back guarantee from an 86 year old industrial company."

OPERATES WITH ANY IBM HOST COMPUTER WITH CICS, BMS, VSAM

- Easy to install/no training required—excellent installation and user documentation.
- Tracks recipients wherever they are signed on.
- Display status of mail sent.
- Message priority assignments.
- Broadcast messages to all computer users.
- Stored message file for frequently used messages.
- Only sender and receiver have access to message.
- Confidential message recognition.
- Total message security.
- Incoming mail signal will not interfere with current screens.
- Message activity statistics.

**ORDER TODAY!
SATISFACTION GUARANTEED!
\$395.00**

When check accompanies purchase order.
Or, \$495.00 if billed. Price effective until 3/1/84.

NO RISK

30-day Money Back Guarantee by Steel Heddle since 1898.

SH STEEL HEDDLE
WIZARD MAIL DEPT. CW

Post Office Box 1867
Greenville, South Carolina 29602 USA
Telephone: 803/244-4110
Telex: 57-0416 Cable: Stehedco

Disk Links Exchange To Micros

McLEAN, Va. — Source Telecomputing Corp., a subsidiary of the Reader's Digest Association, Inc., is offering a software disk to link its electronic service to personal computers.

The company's electronic service, called the Source, is a central exchange for business and financial information, news and sports scores, travel advice and games. It costs \$20.75 per weekday hour.

The new software, dubbed the Sourcelink, works on IBM's Personal Computers. A package for Apple Computer, Inc.'s equipment is under development, according to Source.

Sourcelink is priced at \$149. It is now available from Source Telecomputing at 1616 Anderson Road, McLean, Va. 22102.



LineMaster

An intelligent device for dial-in access to your mainframe 3270 BiSync line.

LineMaster

is a communications watchdog which keeps a line in service until a user dials in.

- For any remote 3271/4/6 line, up to 19.2K baud.

- Compatible with any 3270 BiSync emulator including microcomputers.
- Connects between modem and mainframe.
- Installs in minutes.

\$639.

MF Microframe, Inc.
205 Livingston Avenue
New Brunswick, NJ 08901
(201) 828-4499

IBM 3270 Protocol Conversion as low as \$665 per channel

BISYNC SNA/SDLC ↔ **ASYNC ASCII CRT'S PRINTERS PC'S**

DATALYNX™/3274

- Emulates IBM 3274-51C up to 19.2 kbps
- 5-9 async PCs, CRTs and printers in emulation of 3278 or 328X to 1 or 2 hosts
- PC support for IBM PC (\$60), HP-120/125, Apple II/III, Xerox 820, Osborne, VT-180, Rainbow, COMPAQ, TRS 80-II, Direct, Etc.
- File transfer program for IBM PC
- User-friendly menu setup
- Screen painting for fast response
- Password security and inactivity disconnect for dial-up users
- Concurrent 3278/3287 operation on one port



LOCAL DATA

2701 Toledo St.
Torrance, CA 90503

Phone: (213) 320-7126
TELEX 182518

THE INFORMATION ANALYSIS SYSTEM THAT WON'T PLAY A BIT PART.



Some software systems are like walk-on actors; they're usually kept standing offstage. But not SPSSX.™ Because SPSSX offers everything you need to organize, summarize and display information in scores of productive ways. It's a totally new Information Analysis System which we've designed with the most advanced statistical capabilities yet. To play a leading role in any IBM or Information Center environment.

Want to enhance efficiency? With minimal training, anyone in your organization can start using SPSSX to get the critical information they're after. In the time it takes users to explain a problem to a programmer, they could be obtaining answers and putting them to work. Permitting the programmer to devote more time to other applications.

Need advanced file management capabilities? SPSSX lets you define and combine data from any number of files, regardless of complexity or structure.

Searching for sophisticated statistics? Over 50 major statistical procedures are at your command, from simple table and plot procedures for

novice users to state-of-the-art multivariate techniques for more sophisticated users.

Interested in evaluating computer performance? SPSSX gives you the power to read and analyze SMF and RMF type data, and to turn this system performance information into concise, understandable reports.

These are just a few of the many capabilities that make the SPSSX Information Analysis System such an incredibly productive performer. For more information, call or write for our descriptive brochure today.

© Copyright 1983, SPSS Inc.

**PRODUCTIVITY
RAISED TO
THE HIGHEST POWER™**



SPSS Inc. 444 N. Michigan Ave. Chicago, Illinois 60611
(312) 329-2400

SPSSX currently runs on IBM OS, CMS and Digital VAX™ systems. Conversions will soon be available for IBM DOS, DEC 10 and 20, PRIME, Univac 1100, Data General MV 8000 series and other minis and mainframes.

Photographed at IBM Data Center, Chicago, IL

Assembler Assists X.25

ALEXANDRIA, Va. — Dynatech Packet Technology, Inc. has unveiled a two-trunk packet assembler/disassembler that interfaces with asynchronous terminals and acts as host to Ansi X.25 networks.

Designated the Model 232, the device supports from eight to 32 ports. It comes in two versions: one capable of connecting trunks at speeds from 1.2K bit/sec to 19.2K bit/sec and another capable of handling trunk speeds of up to 64K bit/sec.

The packet collects usage information to aid in billing and to link level statistics to monitor trunk-line quality. Its maker said it can be connected to any public or private X.25 network.

The new device includes a password-protected port for

remote control and diagnosis. Each of its remaining ports can be given an individual configuration. It will support asynchronous devices with schemes for data forwarding, flow control and editing.

Price on a 23-port packet ranges from \$10,000 to \$16,000.

Delivery is four to six weeks from Dynatech at 6464 General Green Way, Alexandria, Va. 22312.

Telephone Accounting Variation

Bitek System Monitors PBX Ports

LONG BEACH, Calif. — Bitek International has put on the market a communications system for monitoring use of computer ports that are accessed over private branch exchange (PBX) lines.

The setup, called the Telcam system, is a variation on a telephone accounting system, according to a company spokesman. It consists of a minicomputer, memory,

line-access cards and a software program.

It keeps track of internal connections to the computer port and records the duration of the access. External connections require data entry by the PBX attendant.

The system also generates a report on the connections, listed by terminal. Available daily or at longer intervals, the report can contain a max-

imum of 32,000 connection listings. Bitek said its system can handle from 20 to 2,000 calling data terminals and up to 150 computer ports.

Price ranges from a low of \$17,000 for a 48-station setup to a high of \$40,000. Deliveries will start in late October or early November, according to Bitek, which is located at 6015 Obispo St., Long Beach, Calif. 90806.

LAX Pact Announced At Sita Meet

(Continued from Page 79)

In addition, the departure gates themselves will become "generic" in the sense that they will not be designated for use with a specific airline. Airline employees will be able to use any gate terminal after identifying themselves with a magnetically coded card. According to Freeman, this should help to alleviate the problem of overcrowding in the airport.

More Agreements Sought

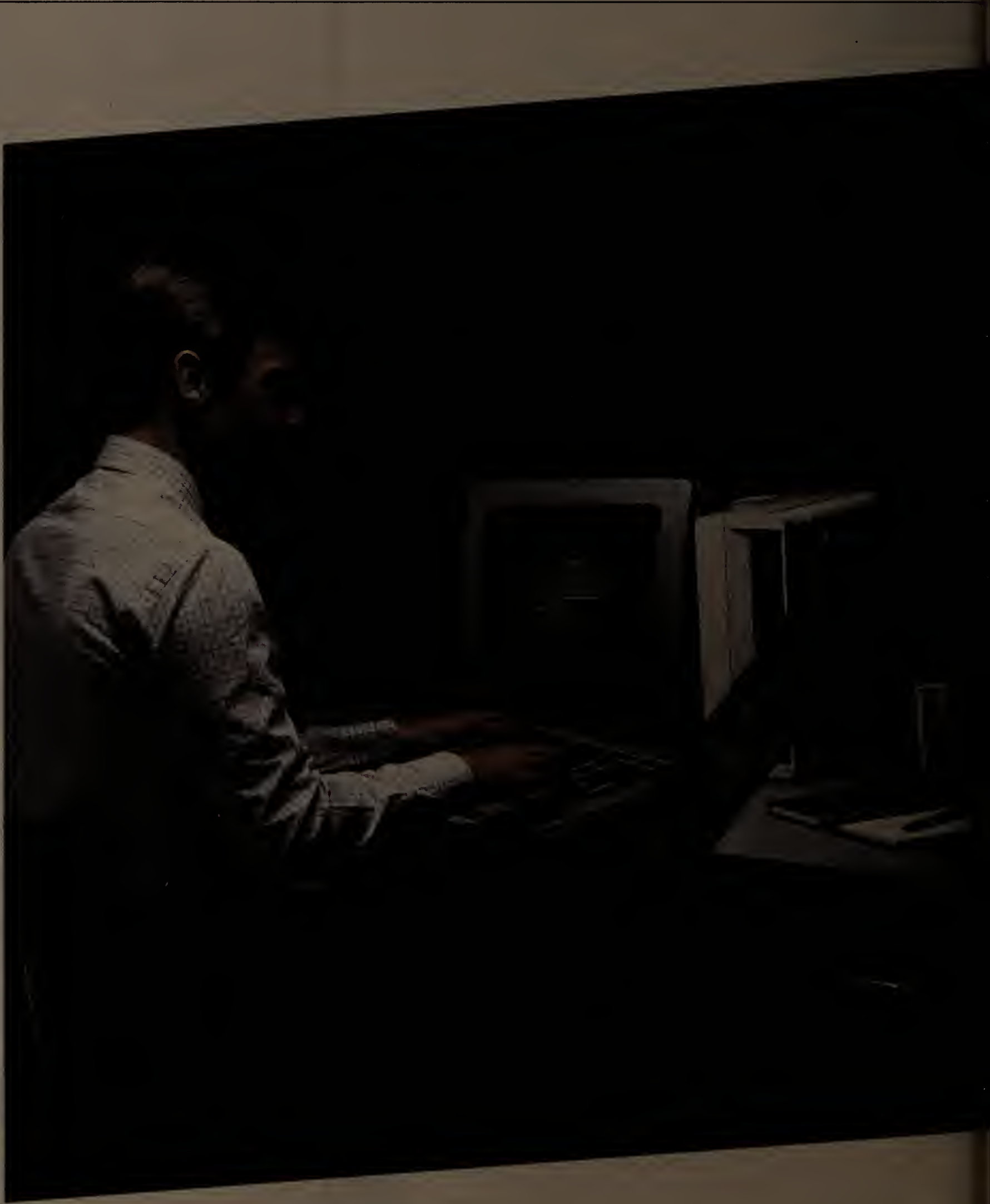
Similar agreements are being negotiated with airports in Frankfurt and Munich, West Germany, and Cairo, Egypt, with long-range plans in the works for Chicago, Miami and San Francisco, according to Freeman.

Timatic, the automation of the travel information manual, will go on-line next month and will be available to all Sita members by January.

Coordinated by KLM Airlines and updated monthly, the manual contains vital information on requirements for entry to countries around the world. Now the information resides in a data base in Atlanta and can be used in conjunction with Sita's Gabriel reservations system.

"Timatic is a logical extension of what you can do in real time," commented Monica Sinclair, Sita's manager of passenger services development. "We're not replacing the booklet, but we are giving the airlines the ability to retrieve this information on a real-time basis."

The next Sita conference will be held in Saudi Arabia next February or March, a conference official said.



Input Module Boasts Bus Compatibility

BROOKFIELD, Conn. — Connecticut Microcomputer has come to market with a 16-channel analog input module which acts as a self-contained bus-compatible device.

Designated the Model D16, the unit works with any computer fitted with an IEEE-488 interface, a vendor spokesman said.

The input module accepts commands from its host computer to read data or activate the timer and buffer. It converts data to eight bits at 100 microseconds. A built-in timer operates from 0.1 seconds to 48 hours. It is available for \$495 from Connecticut Microcomputer at 36 Del Mar Drive, Brookfield, Conn. 06804.

Terminal Aids Full Page Processing

HASTINGS, Minn. — Micro Display Systems, Inc. has announced the Genius full page display terminal which allows the user to custom design a system to facilitate full page processing in all applications from data base management to word processing for automated office systems.

The Genius terminals feature 57 lines by 80 characters; reverse video; flashing attributes; phosphor choices of black/white, green or amber;

multiple protocol; high resolution; and DIN standard keyboard.

This product is available in two models. The Model 202-IBM Personal Computer and IBM Personal Computer-compatible, full page Ascii terminal combines the full page, high-resolution display with a fully configured, low-profile DIN standard keyboard with ten assignable function keys. Model 212-Digital Equipment Corp.

VT100 emulation is supported by a fully compatible, low-profile DIN standard keyboard.

The price is \$1,995 for each model from Micro Display Systems through 1310 Vermillion St., P.O. Box 455, Hastings, Minn. 55033.

Product Pair Facilitates Transmission

BREWSTER, N.Y. — American Photonics, Inc. has introduced two fiber-optic products to be used as aids in coaxial and wire transmissions.

The RL5000 Ethernet Extender is a fiber-optic transmitter and receiver that, along with a suitable fiber-optic cable, functionally replaces an Ethernet or IEEE 802.3 transceiver cable. The RL5000 provides transmission between a Xerox Corp. Ethernet local-area network transceiver and a station controller for up to 1,000 meters.

The DL1020 point-to-point fiber-optic link is used to transmit and receive data up to 10M bit/sec.

Both products are available in single quantities at costs of \$1,500 for the RL5000 and \$1,194 for the DL1020 from American Photonics, Milltown Office Park, Rt. 22, Brewster, N.Y. 10509.

Controller Said to Hold 320 Devices

TULSA, Okla. — Telex Computer Products, Inc. has introduced a remote control unit with extended function capability said to support up to 320 devices.

The 274C controller reportedly allows attachment of both Telex Computer Products and IBM terminal devices that support A-type coaxial cable. The controller features both IBM's protocol Binary Synchronous Communications and Synchronous Data Link Control (SDLC) communications protocols, the vendor said.

Under IBM's Systems Network Architecture (SNA) and SDLC, the 274C reportedly supports all SNA parameters as defined for the IBM 3274 41C controller. The control unit is also said to be compatible with IBM's network problem determination application program for SNA/SDLC net problem determination and isolation.

Priced at \$10,000, the unit is available from Telex Computer Products at 6422 E. 41st St., Tulsa, Okla. 74135.

GET IN ON THE BOOM.™

Your job requires that you respond and react to a wide variety of constantly changing situations and demands. You communicate with more and more people in a growing number of departments. You need computer systems with the flexibility and capability to adapt — to grow with your company.

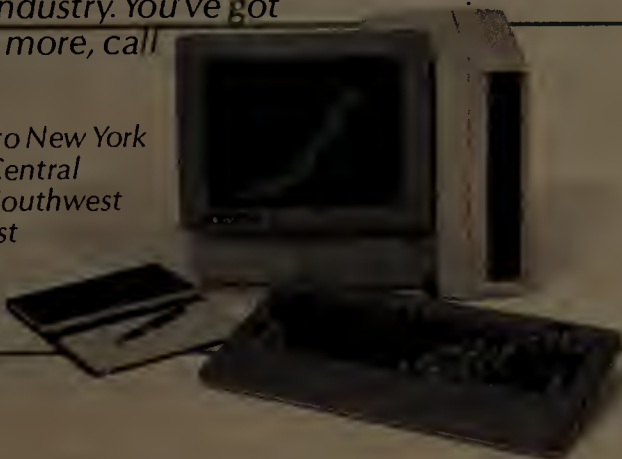
TeleVideo® Personal Computers offer you more options for communication. Between TeleVideo computers or between TeleVideo and other computers. You can even interface with mainframes using standard IBM communications protocols. Your TeleVideo installation grows as fast as your company does by plugging as many as 16 workstations into our network processors.

Desktop or portable, 8-bit or 16-bit, nobody offers you a more extensive, more networkable line of personal computers. Not IBM.® Not Apple.® Nobody. So when you want computers to talk to each other, talk to one vendor.

TeleVideo. We've got comfort features that enhance productivity — ergonomically designed keyboards with natural palmrests, 14" non-glare tilt-adjustable screens. We've got the power you require: 64 K RAM, expandable to 128 K in our 8-bit TeleVideo 803; 128 K, expandable to 256 K in our 16-bit 1603. And TeleVideo supports both CP/M® or MS™ DOS. You can consolidate all the software your departments are running already.

TeleVideo Personal Computers. A comprehensive single vendor solution from the established leader in the independent CRT industry. You've got every reason to get in on the boom. To learn more, call the TeleVideo office in your region.

Southeast (404) 447-1231 • East (703) 556-7764 • Metro New York (516) 496-4777 • Northeast (617) 890-3282 • South Central (214) 258-6776 • Rocky Mountain (408) 745-7760 • Southwest (714) 752-9488 • Midwest (312) 969-0112 • Northwest (408) 745-7760 • Southern Europe (33) 1687-3440 • Central Europe (31) 752-87461 • Northern Europe (44) 908-668778 • International (408) 745-7760. For more information, call 800-538-1780 (in California, (408) 745-7760).



TeleVideo Personal Computers

TeleVideo Systems, Inc.
1170 Morse Avenue, Sunnyvale, CA 94086

TeleVideo Systems are fully serviced nationwide by TRW • Apple is a registered trademark of Apple Computer, Inc. • IBM is a registered trademark of International Business Machines, Inc. • CP/M is a registered trademark of Digital Research, Inc. • MS is a trademark of Microsoft Corporation.

Explore the software universe with the *Computerworld Buyer's Guide to Software.*



The software that's right for your system *and* your company's needs is not just 'discovered'. Finding it takes research, an understanding of your current and future business needs, thorough planning, and careful evaluation of the available software. If you've ever had to shop for software, you know the possibilities seem endless. Now, you can explore the software universe with one, easy-to-use reference — the *Computerworld Buyer's Guide to Software*.

The *Computerworld Buyer's Guide to Software* is the third in our series of market-specific directories to computer-related vendors, products and services. It will offer detailed, all-inclusive listings and up-to-date information on software packages and the companies that sell them. Listings are divided into two sections: complete product listings and vendor profiles. Product listings include application software, DBMS, utility software, decision support systems, systems software, micro-computer software and more. Vendor profiles include company name, address, contact information, primary markets served and more. Tab dividers separating each category and cross references will further add to ease-of-use. In addition,

there will be articles on topics such as new thinking in DBMS, software distribution, micro-to-mainframe links and artificial intelligence.

There are an estimated 6,000 vendors in the software market. The *Computerworld Buyer's Guide to Software* will provide buyers with much needed help in sorting through the diverse packaged software offerings. And, it will offer advertisers a powerful vehicle for telling their story to *Computerworld* subscribers at that crucial moment when they are actively seeking software and vendors.

The issue date for the *Computerworld Buyer's Guide to Software* is November 23. Advertising space close is September 30. Watch for our other *Computerworld Buyer's Guides* in 1984.

The *Computerworld Buyer's Guides* are sent exclusively to the more than 114,000 *Computerworld* subscribers in the U.S. One more good reason to subscribe to *Computerworld*.

For more information, call Kevin McPherson at (617) 879-0700 or your local *Computerworld* sales representative.

COMPUTERWORLD BUYER'S GUIDE

Sales Offices:

Boston/Chris Lee, Ed Marecki, Jim McClure, Kathy Doyle, (617) 879-0700
Chicago/Art Kossack, Newt Barrett, Jean F. Broderick, Chris Lee, (312) 827-4433
New York/Mike Masters, Doug Cheney, Ray Corbin, Joan Daly, Fred LoSapio, Gale M. Paterno, (201) 967-1350
Atlanta/Jeffrey Melnick, Mike Masters, (404) 394-0758
San Francisco/Bill Healey, Barry Millone, A.G. Germano, Theodora Franson, Ruth Gordon, Eileen Dunn, (415) 421-7330
Los Angeles/Bernie Hockswender, Bob Hubbard, Beverly Raus, (714) 556-6480

IBM Researchers Reveal Creation Of 512K-Bit Chip

MAUI, Hawaii — In a paper delivered before a microelectronics symposium here, two IBM researchers reported their company has completed development of an experimental version of a 512K-bit memory chip.

This news came the same week IBM released its mid-range 4361 and 4383 processors, both containing a memory chip that stores 256K characters of information.

IBM said the development of the 512K-bit chip was made possible through an electronic technique called plate pushing. This technique permits the use of stronger electrical signals within the chip, which permits the use of smaller circuit elements and fewer connections. This is what is responsible for the wafer's increased capacity.

Analysts predict the chip will be most useful in large-scale systems such as the company's 3080 series, which is capable of carrying out a minimum of 4 million instructions per second (Mips) and in its most powerful configuration can execute 23 Mips.

Most analysts were more surprised by the fact that IBM made such an announcement than by the news of the chip itself. "There's no doubt that IBM will be at the forefront," said Thomas J. Crotty, vice-president of Gartner Group, a marketing research firm, "but I am surprised they are talking about the 512K-[bit] publicly."

"In the old days," one analyst said, "such an announcement meant that commercialization was about five years away. But at the current pace, it could well be three."

DEC Expands LSI Line With J-11-Based Board

HUDSON, Mass. — Digital Equipment Corp. unveiled three single-board, Q-bus-compatible microprocessors, including one that integrates the company's new J-11 processor.

The J-11-based board, called the LSI-11/73, is a high-end addition to DEC's LSI series of board-level products said to have four times the performance capabilities of the LSI-11/23. A spokesman said the LSI-11/73 is the performance peer of the company's PDP-11/44 minicomputer.

With the J-11 as its CPU, the LSI-11/73 is compatible with all PDP-11 operating systems and will run DEC's version of the Unix operating system. The processor holds up to 8K bytes of random-access memory (RAM) and has 8K bytes of on-board cache memory.

The LSI-11/73, which is compatible with all Q-bus peripherals, costs \$2,180 and is scheduled to be available in January.

The firm also unveiled the KXT11-C, a Q-bus peripheral processor the company said can be linked to any LSI-11-based computer or can serve as a single-board computer for machine control applications.

Built around the company's T-11 processor, the KXT11-C holds 32K bytes of static RAM. The board has three serial

communications lines, including two asynchronous and one synchronous. It also has two-channel direct-memory access controllers that pass information without causing interrupts, a spokesman said.

The KXT11-C, which is the first board permitting LSI-11 users to link processors on the Q-bus, costs \$1,785 and is also expected to be available in January.

The third processor is an improved version of DEC's Falcon that supplies four times the minimum and six times the maximum memory of its predecessor.

Dubbed the Falcon-Plus, the processor contains 16K bytes of RAM and can be expanded to 48K bytes, compared with its predecessor's 8K bytes of maximum storage.

Priced at \$790, which is the same as the Falcon, the dual-height board employs a new gate array technology and board design. Falcon-Plus will be available early next year.

Besides the three microprocessors, DEC also announced software that allows applications packages for LSI-11 systems to be developed on VAX/VMS and PDP-11 computers with multiuser operating systems.

DEC is located at 146 Main St., Maynard, Mass.

With Version of 680/30

CIE Enhances 680 Business Line

IRVINE, Calif. — CIE Systems, Inc. has introduced the latest addition to its 680 multiuser business computer family, the 680/35.

The 680/35 is said to be an enhanced version of the mid-range 680/30. Both models are available in either desktop or console configurations. The 680/35 offers users increased disk storage capacity with an 84M-byte drive vs. the 40M-byte maximum offered with the 680/30. The new disk drive unit comes with an integrated 20M-byte streaming magnetic tape drive for data backup.

Users will have the option of adding an additional 84M-byte disk drive to the system for a total disk capacity of 168M bytes, the vendor said.

The new model features a standard 512K bytes of main memory, expandable to a maximum of 768K bytes; a 500K-byte, 5¼-in. double-sided, double-density floppy drive; four RS-232C ports and one Centronics Data Computer Corp. parallel printer port.

The CIE System 680/35 is base priced at \$24,590 from CIE Systems, which can be reached through P.O. Box 16579, 2515 McCabe Way, Irvine, Calif. 92713.

NS789 Card Fits VAX

SANTA CLARA, Calif. — National Semiconductor Corp. has introduced a 1M-byte random-access memory (RAM) card that is said to be fully compatible with Digital Equipment Corp.'s VAX 11/780 64K-byte RAM technology.

The dynamic Nmos, designated NS789, supports the VAX hardware, software, system and standard peripheral options and operates in conjunction with VAX memory controller logic, the vendor said.

The memory card is reportedly configured as a 256K-byte by 39-bit — 32-bit data plus 7-bit error correction code — hex-wide circuit card providing 1,024K bytes of memory.

A company spokesman said the card may be installed by operators with a minimum of downtime.

The vendor also said the design of the card allows the mainframe CPU to access the memory at high rates of speed, with typical read-access time of 222 nsec and read/write/refresh cycle time of 425 nsec. It is provided with an on/off-line switch permitting users to isolate the card from the system without having to remove it from the backplane, National Semiconductor said.

The boards are priced at \$2,700 each by National Semiconductor, 2900 Semiconductor Drive, Santa Clara, Calif. 95051.

UNITRONIX represents DIGITAL

PDP 11/23
SYSTEMS
with 256KB*
memory, 160 Mbyte
winchester, std. 45 ips
9-track tape backup, VT101
CRT, LA120 printer.
Runs RSX11, RSTS,
TSX OR UNIX.
\$32,000
*up to 4MB avail.

TERMINALS
VT100 LA12
VT101 LA34
VT102 LA50
VT125 LA100
VT131 LA120

CPUs
PDP 11/23,
11/23+, 11/24,
11/44 & VAX
PCs
INTERFACES
MODEMS

COMPLETE
DATA SYSTEMS
with Unitronix-
developed standard
or customized
applications software.
VT, LA, LSI, PDP, VAX are trademarks
of Digital Equipment Corporation

DEALERS WANTED...WITH COMPUTER SERVICE CAPABILITIES

UNITRONIX
CORPORATION

197 Meister Ave. Somerville, NJ 08876
TELEX: 833184

CALL FOR LATEST PRICES

(201) 231-9400



AUTHORIZED
digital
TERMINALS DISTRIBUTOR

SYSTEMS & PERIPHERALS

Color Graphics CAD System Targets Printed Circuit Uses

HOUSTON — Summit CAD Corp. has introduced a color graphics computer-aided design (CAD) system for printed-circuit design applications, compatible with the IBM Personal Computer.

The Pathfinder software supports schematic creation, net lists capture, parts list capture, net list validation, computer-aided placement, autorouting of traces, interactive on-screen routing, continuity and space checking, engineering report generation, drill, assembly and support-drawing generation, numerical control tape generation and final film generation.

The Pathfinder system may also be used for nondesign functions with IBM Personal Computer programs such as word processing, mainframe communications and financial planning, the company said.

A standard configuration costs \$29,975 and consists of an integrated

mobile 1,664K-byte random-access memory (RAM) workstation, two 360K-byte diskette drives, 1M-byte hard disk, 83-key detached keyboard, 14-in. color display, 12-in. monochrome monitor, optical mouse, dual Motorola, Inc. 68000 processors and an 8087 floating-point processor.

Additional information about the Pathfinder system may be obtained from Summit at 5222 FM 1960 West, No. 102, Houston, Texas 77069.

National Memory Systems Enters Micro Memory Mart

LIVERMORE, Calif. — The National Memory Systems Corp. has taken its first step outside the market for minicomputer memories by unveiling a memory subsystem for the

Monitor Adapter Board Out

LOS GATOS, Calif. — Eagle Computer, Inc. has announced a color graphics monitor adapter board, which offers color display and graphics capabilities for Eagle and IBM microcomputers.

Capable of operating in color or monochrome, the color graphics adapter offers medium resolution of 320- by 200 pixels and is available with 16 foreground and eight background colors. A high resolution of 640- by 200 pixels may be displayed in the monochrome mode.

Packaged on a single card, the

board fits in the hardware extension slots of an Eagle PC, 1600 or IBM Personal Computer, according to the vendor spokesman.

The board costs \$295 from Eagle Computer, located at 983 University Ave., Los Gatos, Calif. 95030.

Flexible Diskette From Dysan Fits DEC RX50Ks

SANTA CLARA, Calif. — Dysan Corp. has announced the availability of a 5½-in. flexible diskette said to be compatible with Digital Equipment Corp. RX50K disk drives, found in all DEC Rainbows, Decmate IIs, Professional 300 series and Micro II personal and business computers.

The DEC RX50K Format one-sided diskette reportedly offers the standard features found in the DEC disk, including double density, soft sectoring and 96 track/in. The Dysan version of the diskette has its own individual proprietary identification code, which makes it DEC-compatible. Previously, this code was only offered on diskettes sold by DEC, a spokesman said.

Guaranteed 100% error-free, Dysan's disks are offered on an off-the-shelf basis. The suggested list price for the DEC RX50K Format is \$59.50 per box of 10, from Dysan, 5201 Patrick Henry Drive, Santa Clara, Calif. 95050.

IBM Personal Computer and compatible micros.

Called the PC-8000, the new subsystem attaches up to 1,000M bytes of memory storage to the computer. The vendor said it can be used with very large data bases or for software development and as a file server for computer networking.

The setup consists of a controller and one or two disk drives with 16M bytes to 500M bytes of capacity each. It is compatible with both fixed and removable disk media.

The device's access time is 17 msec. The memory will work with IBM's Personal Computer or Personal Computer XT, Compaq Computer Corp.'s Compaq, Victor Business Products, Inc.'s Victor 9000, Columbia Data Products, Inc.'s Multi-Personal Computer and Eagle Computer, Inc.'s Eagle PC, according to a company spokesman.

Prices range from \$6,600 to \$11,900 in 30-piece quantities. Delivery is four weeks, the vendor said.

National Memory is at 355 Earhart Way, Livermore, Calif. 94550.

Disk Drive, Printer Offered For Micros

ELK GROVE VILLAGE, Ill. — NEC Home Electronics, Inc. (Nec), has taken the wraps off two peripheral devices for personal computers: a letter-quality daisywheel printer and a hard disk drive.

The bidirectional printer, called the 15-LQ, has a built-in Centronics Data Computer Corp.-type parallel interface, reportedly giving it compatibility with microcomputers from Radio Shack, IBM and Apple Computer, Inc.

Equipped with a tractor feed, the device prints up to 14 char./sec, according to Nec, the U.S. subsidiary of Tokyo-based NEC Information Systems, Inc.

The hard disk drive is compatible only with NEC's Model PC-8800 microcomputer, Nec said. Three versions of the drive open up differing amounts of storage: 5M-, 10M- and 15M bytes.

Nec said the product introductions mean that for the first time, the company is offering all devices required for an entire microcomputer system.

The price of the printer is \$695, according to a spokesman for the vendor. The drives sell for \$2,295, \$2,995 and \$2,995. Nec is located at 1800 Estes Ave., Elk Grove Village, Ill. 60007.

FREE THERMAL ROLL

WE HAVE A LARGE STOCK OF GUARANTEED HIGHEST QUALITY THERMAL DATA TERMINAL ROLLS FOR

IMMEDIATE DELIVERY!

All sizes to fit Texas Instrument, Hewlett-Packard, Radio Shack, Computer Devices terminals - and others. Absolute quality guarantee by LABELON.

FILL OUT AND MAIL COUPON FOR FREE SAMPLE ROLL

Broadway
INFORMATION SYSTEMS INC.

138 W. 38th ST., N.Y.C. 10018
CALL ORDER DEPT. FOR ADDITIONAL INFORMATION
212-354-7530
TOLL FREE 800-248-5500

FOR YOUR PRINTING TERMINAL



Broadway Information Systems Co.
138 West 38th St., N.Y.C. 10018 Dept. C

Please send FREE sample Thermal Roll for my _____ terminal, model _____

Name _____

Company _____

Address _____

City _____ State _____ Zip _____

Phone _____ Position _____

NEW RELEASE

CICS PRINTER USERS: MAINFRAME TO MICRO SUPPORT ROPES 5.0 REMOTE ONLINE PRINTING

- RELIABLE, EFFECTIVE OPERATION OF PRINTERS
- ONLINE AND BATCH REPORT GENERATION AND RETRIEVAL
- FLEXIBLE ROUTING OF REPORTS
- DOWNLOADING TO PC's
- REPORT BROWSE AND PARTIAL PRINT CAPABILITY
- USER MENUS
- TOTAL ONLINE MAINTENANCE VIA MENUS
- DYNAMIC QUEUE SPACE RECOVERY
- FULL MRO SUPPORT
- REPORT ACCTNG & ARCHIVING
- JES & POWER RETRIEVAL
- PLUS MORE



Axios Products, Inc. is proud that ROPES is the recipient of the ICP Million Dollar Sales Award! As the first product of its kind ROPES continues to serve the world as the standard of the industry.

For more information on ROPES and our 30 day FREE TRIAL call or write
AXIOS PRODUCTS, INC. 2364 MIDDLE COUNTRY RD.
 CENTEREACH, NY 11720 (516) 588-5461

Please send me COMPUTERWORLD for one year. RATES: United States \$44;

Canada, Central & South America \$110; Europe \$165;

All Other Countries \$245 (Airmail Service)

Special Introductory Offer —

End Users save \$5.00

1. BUSINESS/INDUSTRY (Circle One)

End Users

1. Please indicate whether you are an individual or a business user.



COMPUTERWORLD

**375 Cochituate Road, Rte. 30
Box 897
Framingham, MA 01701-9985**

CIRCULATION DEPARTMENT

postage will be paid by

FIRST CLASS PERMIT NO. 709 FRAMINGHAM, MA 01701

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES



BUSINESS REPLY MAIL

SPECIAL INTRODUCTORY OFFER FOR NEW SUBSCRIBERS.* SAVE \$5.00, PAY ONLY \$39.00 FOR A FULL YEAR'S SUBSCRIPTION.

(Basic Annual Subscription Rate is \$44.) *U.S. ONLY

No Other Publication Gives You SO MUCH
Timely News, Money-Making Ideas &
Management Information—**PLUS** Specials
& Bonus Issues!

As a weekly newspaper, **COMPUTERWORLD** gives you thorough and timely coverage of news and ideas of interest to computer users in industry, business, government and education. Unlike monthlies, **COMPUTERWORLD** covers hundreds of relevant news items each week. But beyond the "news" you get much more as a CW reader:

- Weekly "In Depth" articles.
- Monthly "Special Reports" on selected subjects.
- **COMPUTERWORLD BUYER'S GUIDE SERIES**... a comprehensive series of product-specific lists and up-to-date information on each major product area.
- **COMPUTERWORLD OA** with incisive coverage of office automation.
- **COMPUTERWORLD ON COMMUNICATIONS** covers product and system developments in the rapidly changing communications field.
- **PLUS** Other Special Issues Throughout The Year!

SUBSCRIBE NOW

Complete Form On Reverse,
Then Return In Attached
Postage-Paid Envelope. Or Use Your
Charge Card and Call
TOLL-FREE: 1-800-343-5730.

- ☐ Please enter my subscription
(details on back)
☐ I'm already a subscriber, but I'd
like you to change my:

☐ address ☐ title
☐ industry ☐ other

Put old label or label information here

My current mailing
label is attached
and I've filled in
new information on
the other side.



COMPUTERWORLD

You spend half your life at the office.

That's why you should spend one day at INTECH '83.

Frustrated by the time spent and wasted in your "automated" office? Still using incompatible hardware that cannot satisfy your information and communications needs?

You Need INTECH '83

Don't miss INTECH '83, the first and only forum in the world devoted exclusively to the true direction of office automation — the total integration of technologies, functions, and personnel into efficient, highly productive office systems. At INTECH '83 you can attend over 40 conference sessions and see more than 200 state-of-the-art exhibits on office integration by leading companies in the information industry... by vendors of local area networking systems, microcomputers, telecommunications, satellite links, computer systems, data and word processing systems, integrating software, data communications, micrographics, computer graphics, and other integrated systems and services. You will discover what is already here — on line — available and affordable today.

INTECH Is For You

If your word processor isn't compatible with your mainframe... if your accounting department can't hook up to your order department... your company is not operating as efficiently and effectively as it should. You need INTECH '83.

Partial List of Exhibitors

AT&T Information Systems, Apple Computer, Inc., Applied Data Research, Association of Information and Image Management, Computer Automation Inc., Computerworld, Corvus Systems, Inc., Cullinet Software, Inc., Data General, Datapoint Corp., Dictaphone Corp.,

Digital Equipment Corporation, Exxon Office Systems, Gandalf Data, Inc., Infotron Systems Corporation, ITT World Communications, Lanier Business Products, Lee Data Corporation, Management Technology, NBI, Inc., NCR Corporation/OSD, Northern Telecom, Inc., Prolink Corporation, Stratus Computer, Inc., Syntrex Corp., Telautograph Corporation, Telecommunications Products & Technology, The Office, and Tymshare, Inc.

Featured Conference Speakers



John Diebold

— Internationally acknowledged expert; founder and chairman of the Diebold Group, Inc.; coined the term "automation" 30 years ago with his first book — now a classic on office automation.



Edmund B. Fitzgerald

— President of Northern Telecom Limited, Toronto, Ontario, the second largest designer and manufacturer of telecommunications equipment in North America and a significant supplier of integrated office systems.



Dixon R. Doll, Ph.D.

— Founder, President, and CEO of the DMW Group, one of the industry's most well-known independent telecommunications and information systems consulting firms. He is widely recognized as an expert in design, planning, and

implementation of advanced computer systems and communications networks.

save \$15

You need INTECH '83. Register today. If you register before October 15, there is no charge. After October 15, registration is on-site only at \$15. Call **301-459-8383** or **800-638-8510**.

\$10 • Discount Coupon • \$10

Bring this coupon to INTECH '83 and save \$10 off \$15 registration fee for INTECH '83 Exposition only.

McCormick Place, Chicago, Illinois
November 1-2-3, 1983

Hours: Tuesday, November 1, 12 noon-6 pm;
Wednesday, November 2, 10 am-6 pm; and
Thursday, November 3, 10 am-5 pm.

Copyright 1983. National Trade Productions, Inc., 9418 Annapolis Road, Suite 206, Lanham, Maryland 20706. 800-638-8510 or (301) 459-8383.

INTECH '83
Integrated Office
Technology
Conference And Exposition

SMC Plans to Unveil SMP/8301

DALLAS — The SMC Technology Corp. plans to unveil a storage management processor to fit between CPUs and the secondary storage devices associated with them.

Called the SMP/8301, the new device is aimed at those firms with very large data bases, according to a spokesman. It will initially be available on the Gould, Inc. line of 32-bit superminis for IBM and other hosts plus their operating systems.

The processor is said to reduce I/O operations by making the ratio of relevant data to transferred data as functional as possible.

It is put to use through extended concepts in a function space architecture as developed by Set-Theoretic Information Systems Corp. of Ann

Arbor, Mich. SMC Technology is independent of the Ann Arbor research firm, a spokesman said.

Costing from \$200,000 to \$1 mil-

lion, SMP/8301 will be available in the fourth quarter of 1985 from 320 Forest Central Two, 11551 Forest Central Drive, Dallas, Texas 75243.

Ink-Jet Printer Debuts for TRS-80

FORT WORTH, Texas — The TRS-80 CGP-220 ink-jet printer from Radio Shack is a drop-on-demand printer designed to print text and graphics in seven colors.

The CGP-220 prints 2,600 dot/sec in graphics mode with a resolution of 640 dot/line. The text mode offers 12 char./in. at 37 char./sec.

Parallel and color computer-

compatible serial interfaces enable the printer to be used with any TRS-80 computer. A screen print utility for the TRS-80 color computer will allow the CGP-220 to create multicolor printouts.

The CGP-220 printer costs \$699 from Radio Shack dealers. The company is headquartered at 1800 One Tandy Center, Fort Worth, Texas 76102.

Dual Systems Upgrades 8320 To Include RTK

BERKELEY, Calif. — Dual Systems Corp. has upgraded its Motorola, Inc. 68000-based microcomputer, the 8320, to include floating-point processing and a real-time operating system kernel (RTK).

The Unix system's single-card, floating-point processor reportedly performs over 222,000, 32-bit add, subtract and multiply operations per second. The user-transparent processor does division, square root, logarithm and trigonometric functions at rates ranging from 68,000 to 11,500 operations per second on IEEE-compatible, 32-bit single-precision and 64-bit double-precision floating-point data.

The RTK is said to allow real-time control software to be developed on Dual System's 8320 Unix system and then to be downloaded and run on the basic minimum system. Also, the completed RTK operating system may be burnt into erasable programmable read-only memories.

Other enhancements include: an upgraded clock rate of 10 MHz; an upgrade of the Unix Version 7 operating system to the Unix System III; a faster multilayered motherboard; a nine-track backup storage system; and software improvements such as Softest's Lex word processor, Unicorp Software, Inc.'s Viewcomp spreadsheet, Micro Business Software, Inc.'s MBSI accounting package and Unify Corp.'s Unify data base. Additional languages available include Lisp and Ada.

The enhanced version of the 8320 costs \$16,660 from Dual Systems, 2530 San Pablo Ave., Berkeley, Calif. 94702.

Power Stacker Gathers Forms In Sequence

PALO ALTO, Calif. — The Tab Products Co. has unveiled a power drop stacker to gather burst forms in sequence during long runs.

Called the Model 2470, the stacker is being offered by the company as an optional accessory to its Model 2476 burster.

The stacker's one adjustment is for length of forms. The device automatically compensates for the forms' thickness and margin buildup on stacks up to 24 inches.

The Model 2470 stacker will be available Nov. 1 for \$1,250 from Tab at 2690 Hanover St., Palo Alto, Calif. 94304.

There's a lot to like about the new Zenith ZT-10, starting with the price.

Display of how-to-use instructions and terminal setup commands.

Parallel print port standard.

Stores 26 names and phone numbers (to 21 digits).

Business graphics with 33 symbol characters and 95 ASCII. Also parity, edit and erase functions.

One-touch accessing lets you automatically log-on to your mainframe with an optional smart modem.

RS-232 interface at data rates of 110, 150, 300, 600, 1200, 2400, 4800 and 9600 baud.

Normal, reverse, half-intensity, blink video display.

Programmable for up to 26 pre-selected information sources. Can include commands as long as 127 characters.

For modem users, Model ZT-11 has an auto-dial, auto-answer 300 baud modem built in.

Detached full-size keyboard with 63 keys, including "help" key.

Compact, only 15" wide. Keyboard weighs less than four pounds.

\$499.00

IT'S NICE TO HAVE A FRIEND WHO OPENS SO MANY DOORS!!



Tom Wilson

©1983 Universal Press Syndicate

The Zenith ZT-10 represents a major advance in data access terminal engineering. And a major break-through in price/performance.

With the ZT-10 you get an RS-232 port and DEC VT-52 compatibility. Teamed with any Zenith green or amber video monitor, the ZT-10 is perhaps the lowest cost 9600 baud ASCII terminal yet.

Best of all, this terminal-in-a-keyboard actually gives you more for less. Great access power, for instance. With its menu table and single master key you've got one-touch access to mainframes, minis, micros — and any VT-52 terminal system!

Behind the ZT-10 and every Zenith product

is our regional distribution network. This assures you the best in service and support, as well as the fastest possible delivery.

For more information about the ZT-10 and our complete line of video terminals, desktop computer systems, monitors, peripherals and software, see your nearby Zenith Data Systems distributor. Or call (800) 323-5924. In Illinois, call collect (312) 391-8861.

ZENITH

data systems

The quality goes in before the name goes on.

* Based on suggested retail price.



'Your Pin Fell Out, Walker, So I'm Afraid I'm Going to Have to Fire You.'

EASTERN'S SPRINT. WHEN IT DEFINITELY, UNQUESTIONABLY HAS TO BE THERE TODAY.



Most air-freight companies spend the day on the ground, racing to pick up small packages. So they can deliver them *overnight*. At Eastern Airlines, we spend that time in the air, delivering small packages to over 90 cities throughout the U.S. *The same day*. Just have your package at the Eastern airport counter at least 30 minutes before flight time. We'll put it on our next flight out and guarantee that it arrives the same day.* Or you don't pay. The guys who "fly-by-night" simply aren't up to that kind of service.

© 1983 Eastern Air Lines, Inc.

 **EASTERN**

SPRINT
SAME-DAY PACKAGE SERVICE

Door-to-door delivery available for an additional charge. Call toll-free at 800-336-0336.

*Guaranteed same-day delivery requires that package be on a flight scheduled to arrive before midnight.

FLOW_CalcTM

THE VAX Spreadsheet

\$3500

Visit us at
DEXPO® West 83
Booth 840

to try it yourself, call:
800-235-6788 (in California, call 805/964-7724 collect)
TWX/TELEX 910-334-1193

The Software Workshop®

GENERAL RESEARCH CORPORATION • A Flow General Company
5383 Hollister Avenue • Santa Barbara, California 93111

From Northern Telecom

Model 445 DDP Memory Increased

MINNEAPOLIS, — Northern Telecom, Inc., has announced an increased memory capacity for its Model 445 distributed data processing (DDP) system.

The enhancement brings the system's memory up to 384K bytes in performing DDP operations, a 50% increase, the company said. The expanded memory enhancement is the first in a se-

ries planned for customers using the firm's 400 and 70 series DDP systems.

Proprietary software available includes the Omnitask 4.1 operating system, Omniwords word processing, Sedit text editing, Omnilink networking and Acolbol/3.

The new capability is available now for \$750. Monthly leases cost \$28 for a

two-year period or \$23 for three years. Maintenance is priced at \$10 per month.

More information is available from the vendor at Data Park, P.O. Box 1222, Minneapolis, Minn. 55440.

Card Reader Facilitates Two Modes

PLYMOUTH MEETING, Pa. — Peripheral Dynamics, Inc. has unveiled an automatic card reader said to be quiet enough for office use.

Designated the Model 6111, the device is capable of reading 600 cards a minute. It is available in two versions: one reads 80-col. punched cards in transmissive mode, and the other reads 40- and 80-col. mark-sense cards in reflective mode.

Options on the reader include an RS-232C interface, current-loop interface, clock track on mark-sense cards and nonstandard card reading speeds.

The card reader is priced at \$2,375. Delivery time is eight weeks.

Peripheral Dynamics is located at 5150 Campus Drive, Whitmarsh Industrial Park, Plymouth Meeting, Pa. 19462.

Interface For HP 3000 Introduced

STAMFORD, Conn. — Digital Associates Corp. has introduced a high-speed printer interface for the Hewlett-Packard Co. HP 3000 series (3000/3X through 3000/6X) systems.

The HP-IB interface, upgraded from an earlier product, shares a high-speed general interface channel with disks and other independent network processors. A separate interface channel is not normally required to interface Digital Associates' plug-compatible printer systems to these HP processors, a company spokesman said.

The HP-IB interface saves a slot for other peripheral applications and eliminates the need for a separate HP 26069A translator card for operation of a line printer. In addition the interface can drive multiple line printers from the same general interface channel, the firm said.

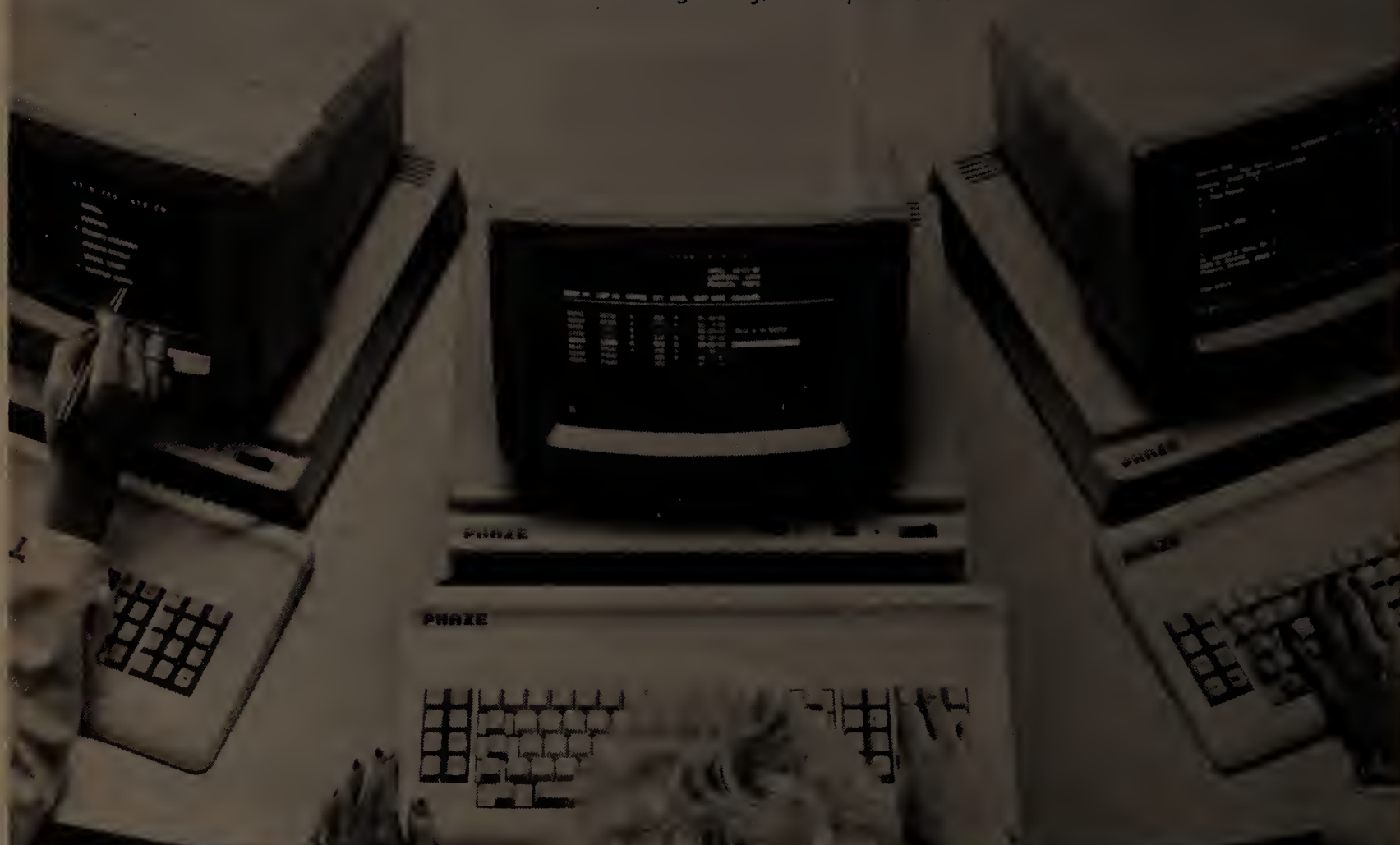
The stand-alone price of the HP-IB interface is \$2,500 from Digital Associates, 1039 E. Main St., Stamford, Conn. 06902.

3270 Users ...

**Get 3278 Features for less than 3178 Prices.
...from PHAZE**

A superior value

IBM announced its 3178 on March 8, 1983. The PHAZE P3278 has been available since November 8, 1982. Our lower cost, more functional 3278/3178 alternative is available now. And, at \$1545, our coax plug-compatible P3278 will be the star of your add-on and replacement program. That's because PHAZE makes the addition easy. More importantly, you'll get a host of special features not found on theirs. That makes PHAZE a good buy, and a superior value.



Easy to use

The compact, modular P3278 can be installed in less than 60 seconds. Without heavy lifting. Without tools. Easy installation reflects the human engineering features of the unit. Features like an easy-on-the-eyes, non-glare screen that tilts and swivels with fingertip command. A thin movable keyboard, with a continuously adjustable angle through the optimum range. And PHAZE meets the tough European human factors requirements.

Extras that don't cost extra

Standard features include an 87-key typewriter keyboard with 24 program function keys, a 12-key numeric keypad, automatic video shutdown,

combination security locks, a numeric lock and an audible alarm. The only option to buy is a light pen.

Satisfaction guaranteed

PHAZE makes your purchasing decision risk-free. In addition to our standard 90-day warranty, we offer a 30-day money back guarantee if you're not completely satisfied with our product.

Terrific price. An unusual range of features. Money-back guarantee. And liberal quantity discounts. PHAZE will make you a purchasing legend in your own time. Call us today to place your order or to obtain more information. Ask for H. P. Watson at (602) 991-6855.

PHAZE is a registered trademark of PHAZE Information Machines Corporation.

PHAZE
INFORMATION MACHINES CORPORATION

We make the addition easy

PHAZE Information Machines Corporation
7650 East Redfield Road
Scottsdale, Arizona 85260

Introducing the only computer tape certified error-free at 6250 CPI



GRAHAM ULTIMAG,[®] THE ULTIMATE IN MAGNETIC COMPUTER TAPE, is manufactured on Graham's new state-of-the-art coating line. Each reel is then independently full-length certified error-free at both 6250 CPI and 1600 BPI on the Qualifier* (Graham's new advanced technology certifier). This new and revolutionary product is the culmination of many years of extensive research, planning and investment by Graham Magnetics, the industry leader in computer tape technology.

Innovative production procedures are used to produce Graham Ultimag and one of the results is a less abrasive tape — that means a minimal amount of headwear.

Graham Ultimag has a patented binder system which will not suffer adhesive/cohesive failure under normal use. Internal testing proves it will even withstand storage at 120°F and 100% relative humidity for 2,500 hours without deteriorating.

The Graham Ultimag warranty indicates the confidence Graham has in Ultimag. If a tape fails due to workmanship or material defects, Graham will replace it. Should adhesion/cohesion failure occur, Graham will reimburse the user for data reconstruction costs up to \$5,000.**

At Graham Magnetics, superior products and superior service go hand-in-hand . . . because you can't afford anything less.

The Magnetic Media Company

Graham Magnetics

Graham Magnetics Incorporated
Subsidiary of Carlisle Corporation
6625 Industrial Park Boulevard
North Richland Hills, Texas 76118

CARLISLE

Compatible With Victor 9000

Hard Disk Storage System Enhanced

ANAHEIM, Calif. — IQ Systems, a subsidiary of Applied Circuit Technology, Inc., said its hard disk storage systems are now compatible with the Victor Technologies, Inc.'s Victor 9000 business computer.

The 5¼-in. Winchester disk setups, called the Graymatter family, were previously compatible with Apple Computer, Inc.'s Apple II and IIe, IBM's Personal Computer and Osborne Computer Corp.'s Osborne I, according to IQ Systems.

The storage unit is available in versions with 5M, 10M and 20M bytes of memory.

Designed by Claremont, Calif.-based Lodestar Systems, Inc., the

software package enables the storage unit to run on the Victor computer's Digital Research, Inc. CP/M 86 and Microsoft, Inc. MS-DOS dual operat-

ing codes.

It costs \$2,195 from IQ Systems, 2931 La Jolla St., Anaheim, Calif. 92806.

Corvus Cuts Storage Systems Prices

SAN JOSE, Calif. — Prices of the Corvus Systems, Inc. Winchester mass storage systems have been reduced by up to 14%.

The 5.9M-byte Model 6 unit is now priced at \$2,195, down from \$2,495. The 12.1M-byte Model 11 has been reduced from \$3,495 to \$2,995, while the 18.4M-byte

Model 20 now costs \$3,995, down from \$4,495.

Prices of add-on disk drives, Omninet disk systems and Omninet disk systems with built-in Corvus mirror back-up storage capability have also been reduced, Corvus said from 2029 O'Toole Ave., San Jose, Calif. 95131.

Storage Unit Designed for Use With Desktop

MINNEAPOLIS — Northern Telecom, Inc. has introduced a 10M-byte hard disk storage unit intended to be used with its desktop office information system.

The unit, called the Model 5010, is equipped with a 5¼-in. mini floppy disk for load and backup plus a 5¼-in. Winchester hard disk drive for storage. It also holds its own power supply and logic cards.

The new storage unit connects electrically to Northern Telecom's Model 503 desktop system via shielded flat ribbon cable.

The unit's price is \$3,870. It is expected to be available Oct. 21 from Northern Telecom through Data Park, P.O. Box 1222, Minneapolis, Minn. 55440.

Nu Data Unveils Add-On Devices For Printers

LITTLE SILVER, N.J. — The Nu Data Corp. has introduced a single-line and a multiline loop converter and a message waiting device for computer printers.

The loop converter, named the Model 319, is arranged as a full-duplex unit which can convert to 20mA loop current signals at up to 19.2K bit/sec. The multiline version incorporates 12 full-duplex converters. It is a 3½- by 19-in. rack that operates at 110 Vac and 60Hz.

The message waiting device, called the Model 610, is designed for offices in which the printer is up to 1,000 feet from the computer. The 4- by 3-in. device lights up when a message has been received. Both types of device connect via an RS-232 data link, a spokesman said.

Price is \$125 for the single-line converter, \$1,250 for the multiline converter. The message waiting device costs \$95. Both are available from Nu Data, 32 Fairview Ave., P.O. Box 125, Little Silver, N.J. 07739.

Cesi Adapter Fits Omnipac, PDP-8A Minis

HOUSTON — Computer Extension Systems, Inc. (Cesi) has announced the MDC8 host adapter, an intelligent hexwide printed-circuit board for Cesi's Omnipac and Digital Equipment Corp.'s PDP-8A mini-computers.

Utilizing families of 5¼- and 8-in. Winchester disk drives, the MDC8 and Sasi disk controller allow the addition of a disk storage system to all DEC Omnibus-based systems, according to Cesi.

Each unit will support two Winchester drives and two floppy drives, the vendor said.

Cesi supplies OS/8 software handlers with the MDC8 along with technical manuals for \$1,250 from 17511 El Camino Real, Houston, Texas 77058.

2 Trillion

Last night we backed up
two trillion (yes, that's 12 zeroes)
characters of data, and
checked our work.

VMBACKUP

We bring files back alive, the way they should be—readable, usable—which some "cut-rate" backup systems *don't* do. We verify the data before moving it to tape. That's why 75% of the Fortune 100 companies trust their vital data to VMBACKUP.

How do we do this?

- Start with a solid design.
- Take the best systems people in the VM community.
- Have them build it right.
- Add competent, helpful support people.
- Stay close to our customers.

VM Software Inc.

(703) 821-6886

And we create a winning situation for our users.

London • Frankfurt • Paris • Stockholm • Milan • Tel Aviv • Rio De Janeiro • Sydney • Tokyo

VMBACKUP Sounds Great!

- ☐ Call me.
- ☐ Send more information
- I'd also like information on your other products checked

- ☐ **VMACCOUNT:** Complete online collection, costing, & reporting.
- ☐ **VMARCHIVE:** End-user initiated archive/restore to intermediate disk or tape
- ☐ **VMSECURE:** Complete security & directory management
- ☐ **VMTAPE/CMS:** Tape management featuring drive management, SL tape support, security, and audit file.
- ☐ **VMLIB:** A source library control system offering compression, **COPY/INCLUDE** cross reference, and management of the development process.
- ☐ **VMSCHEDULE:** A complete scheduling and monitoring system for end-users.

Name _____ Title _____

Company _____

Address _____

City _____ State _____ Zip _____

CPU _____ Phone _____

The genius of Team Xerox.

XEROX

XEROX 8010 PROFESSIONAL WORKSTATION © XEROX CORPORATION



The 8010 professional workstation has always been known as a computer of dazzling capabilities, especially in its graphics, information processing and document preparation.

Team Xerox But what some people may not know is that the 8010 is also the key element in Team Xerox, a system of office machines designed to work together like a team.

When part of an Ethernet network, the 8010 can work with a wide array of word processors, mainframes, personal and business computers, printers, electronic mail and file services, facsimile terminals, communicating Memorywriters, other networks and, of course, other 8010's. It also provides 3270 and TTY emulation.

Its full 17" bit-mapped screen lets you view two full pages simultaneously and open up to six documents at a time without covering up a previous document.

It's also the only workstation that can create and print documents in more than a dozen languages, including Russian and, for the first time, Japanese (Katakana, Hiragana and Kanji).

While other workstations may use Xerox innovations like the mouse, icons, windows, property sheets and combined text and graphics, the 8010 simply does more with them.

For example, the 8010's extensive software is fully integrated, to allow you to work with text and graphics simultaneously. You can draw a flowchart right in the middle of a full page of text without

having to resort to a separate program and limited buffer "scratchpad" or "clipboard."

In terms of capabilities, ease of use and overall value, the 8010 would have to be considered the stellar workstation in the industry.

For more information, call 800-527-1922 (in Texas, 800-442-0152), or send in the coupon. Or ask anyone who's ever used the 8010.

Xerox Corp., Box 470065, Dallas, Texas 75247.

☐ Please have a sales representative contact me.

☐ Please send me more information.

Name _____ Title _____

Company _____

Address _____ City _____

State _____ Zip _____ Phone _____

Bits & Pieces

General Robotics Cuts Price of Workstation

HARTFORD, Wis. — General Robotics Corp.'s Computer-Aided Design (CAD) Systems Division has announced a price reduction on its printed circuit CAD workstation, the PCB Draftsman II. The domestic price has

been reduced by more than 6%, the vendor said.

The PCB Draftsman II workstation is an interactive tool for the layout of printed circuit boards by PCB designers. The hardware consists of a dual computer using Digital Equipment Corp.'s LSI-11/12 front-end with memory management

and hardware floating point processor. The graphics computer is a high-speed, 32-bit bit-slice CPU, with up to 2M bytes of display memory.

The software provides single keystroke functions, autorouting, autoplacement, schematics, design rule checking and network listing.

The price is \$69,900 and includes one week of on-site training. Further information is available from General Robotics, CAD Systems Division, 57 N. Main Street, Hartford, Wis. 53027.

Unit Ties Peripherals, VMEbus Compatibles

SUNNYVALE, Calif. — Astraea Computer Corp. has announced the AC-V31, an interface module designed to connect systems compatible with the VMEbus with external peripherals using the Sasi interface.

The AC-V31 resides in the VMEbus short I/O address space and occupies a user-selectable, contiguous 256-byte block of addresses. The unit uses a P2 connector for connection to the Sasi channel interface, the vendor said.

The unit costs \$350, the vendor said from 846 Del Rey Ave., Sunnyvale, Calif. 94086.

Type 3056 Regulates Voltage, Cuts Noise

SAN DIEGO — Gould, Inc.'s Power Conversion Division has brought to market a 500W uninterruptible power supply.

Called the Type 3056, the on-line power supply continually regulates voltage and eliminates noise for personal computers, point-of-sale terminals and other kinds of sensitive load, the vendor said.

It also includes a 10-min internal battery for use during power failures. The power supply can be hooked to an external 48V battery for longer periods.

Fitted with power metal oxide semiconductor field effect transistors switching at 70 kHz, the uninterruptible supply maintains 120V output when powering nonlinear loads. It stands approximately 5-in. high and is 17-in. wide, weighing 75 lb.

Price starts at \$1,450. Delivery takes four weeks.

Further information is available from Gould's Power Conversion Division, located at 2727 Kurtz St., San Diego, Calif. 92210.

U.S. Design Upgrades Controller to 64K Bytes

LANHAM, Md. — U.S. Design Corp. has unveiled a 64K-byte disk controller for its family of Winchester storage systems.

The unit upgrades the 32K bytes offered on the company's 70M-byte Digital Equipment Corp.-compatible storage systems.

With a ¼-in. cartridge backup and Q-bus interface, the controller sells for \$9,995. It is currently available with deliveries of four weeks.

U.S. Design is at 5100 Philadelphia Way, Lanham, Md. 20706.

QDP-100 Series Board Targets Faster Speed

CLEVELAND — QDP Computer Systems has upgraded its QDP-100 series with a dual-CPU board, the SCS-1, said to provide an increase of speed from 4 MHz to 6 MHz to take better advantage of the capabilities of the QDP cache memory.

Also announced was a price reduction on QDP's peripheral drive. The 30M-byte hard disk add-on unit for the QDP-100 series now carries a suggested retail price of \$6,995, a reduction of \$1,000 from its introductory price.

The SCS-1 contains two Zilog, Inc. CPUs: the 6 MHz Z80B-CPU and a Z80A-DMA processor that reportedly permits high-speed data transfer. Other features include 128K bytes of random-access memory; two 8-in., double-side, double-density floppy disks; four serial and two parallel ports; and QDP "help" and "menu" programs, along with its Perfect Software.

This S-100 bus microcomputer now works many times faster depending on the amount of disk accessing in a given program, the vendor said. A six-slot motherboard reportedly offers more expansion capability than previously, and up to six serial ports and two parallel ports are provided.

The single-user SCS-1 6 MHz dual-CPU board costs \$1,795. The SCS-1 multiuser configuration, with six serial and two parallel ports, is \$2,195 from QDP Computer Systems, 10330 Brecksville Road, Cleveland, Ohio 44141.

BPS Announces Line Of Power Supplies

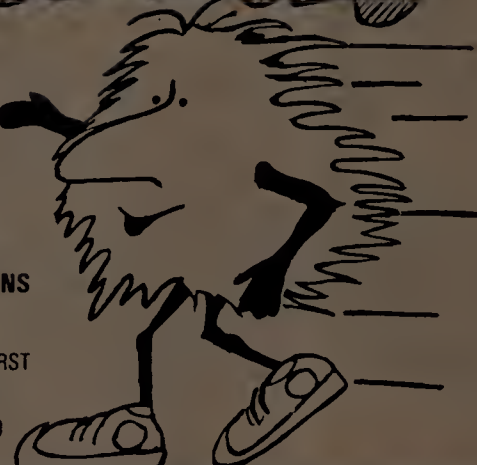
DALLAS — Bits Power Systems, Inc. (BPS) has announced a line of on-board uninterruptible switching power supplies that are packaged with Winchester and floppy disk subsystems.

The Model US-200 is said to ensure that the computer and associated subsystems have continuous power when the quality of the utility power is below par or missing entirely. It provides six uninterruptible outputs for programmable read-only memory programming power. Each output of this convection-cooled unit has over-voltage, overload and short-circuit protection.

Model US-200A has the same features for S-100 systems. The models are priced at \$195 each from BPS, Suite B114, 11020 Audella Road, Dallas, Texas 75243.

WHAT IS FASTER
AND MORE POWERFUL
THAN A TSO
CLIST??

PROC MAN!



PROC MAN:

- COMPILES TSO CLISTS
- REDUCES CLIST RUN TIMES
- GREATLY REDUCES CLIST CPU OVERHEAD
- PROVIDES MULTI-LEVEL SECURITY BY CLIST
- ALLOWS EASY ADDITION OF USER FUNCTIONS
- REQUIRES NO SYSTEM OR CLIST MODIFICATIONS
- ENHANCES THE SPF DIALOG MANAGER

TONE

Software Corp.

Call or 1735 SOUTH BROOKHURST

write ANAHEIM, CA 92804

for PHONE: (714) 991-9460

details TELEX: 181592

MicroAge®

"THE RIGHT COMPUTER STORE FRANCHISE FOR ME!"

"They wanted us to succeed and they acted like it!"

"At our West Palm Beach, Florida, MicroAge Computer Store, we sell primarily to business people, professionals and corporate accounts. Being part of the MicroAge Computer Store network gave us the knowledge, support and name recognition we found to be essential to our success. Plus, during our first year and a half, MicroAge developed a relationship with us that helped us bypass potential mistakes and grow."

"Since joining MicroAge, our store size has doubled and our staff has quadrupled. Today our store has expanded from 1,800 square feet to 3,700 square feet, while our staff grew from 3 people to 13 people. Our growth with MicroAge has been beyond my expectations."

"Am I satisfied with my MicroAge franchise... absolutely!"

Lonny Warsaw
Lonny Warsaw
President

To build your own professional computer sales organization with MicroAge write to:

MicroAge.
COMPUTER STORES

1457 West Alameda • Tempe, Arizona 85282
(602) 968-3168





For the Televideo computer of your choice, dial us direct and save.

Kierulff is the place to get Televideo computer systems. The most complete line of personal and professional micros in the industry. From 8- and 16-bit machines, to multi-user systems, and the

new portable, Televideo has them all. And that means Kierulff does, too.

KIERULFF
System Products Group

Find out for yourself.
We're on the other end of
your telephone.
● **TeleVideo Systems, Inc.**

We help you put it all together.

Better.

AL Alabama (800) 237-8545 AR Arkansas (800) 331-3071
CA Los Angeles (213) 725-0325, (213) 994-0316, Palo
Diego (619) 278-2112, San Luis Obispo Zenith 19530,
Tustin (714) 731-5711 CO Englewood (303) 790-4444
DC Washington (301) 247-5020 DE Delaware (201) 575-6750
Miami and Palm Beach in State (800) 432-8028, St. Petersburg (813) 576-1966, (800) 282-8944
IL Elk Grove Village (312) 640-0200 IN Indiana (800) 323-0571 KS Kansas (800) 325-1039
ME Maine (800) 225-0692 MD Maryland (301) 247-5020 MI Michigan (800) 321-1436 MN Edina
(800) 237-8545 MT Montana (800) 525-1274 NB Nebraska (800) 525-1274 NC Greensboro (919) 852-9440 ND North Dakota (612) 941-7500 NH New Hampshire (800) 225-0692 NJ New Jersey (201) 575-6750 NM New
Mexico (800) 525-1274 NV Las Vegas (800) 528-4515, Reno (415) 968-6292 NY New York City (201) 575-6750, Upstate (617) 667-8331 OH Cleveland (216) 587-6558, In State (800) 362-1921, Out Of State (800) 321-1436
OK Tulsa (918) 252-7537, (800) 722-3900 OR Portland (503) 641-9150 PA Eastern (201) 575-6750, Western (800) 321-1436 RI Rhode Island (800) 225-0692 SC South Carolina (919) 852-9440 SD South Dakota (612) 941-7500
TN Eastern (919) 852-9440, Western (312) 640-0200, In State (800) 237-8545 TX Austin (512) 835-2090, Brownsville (512) 544-7212, Corpus Christi (512) 884-6167, Dallas (214) 343-2400, Houston (713) 530-7030, Laredo
(512) 726-1697, San Antonio (512) 349-0396, In State (800) 442-1041 UT Salt Lake City (801) 973-6913, In State (800) 662-8630, (800) 662-8631 VA Northern (703) 621-2592, Southern (800) 638-4994 VT Vermont
(800) 225-0692 WA Tukwila (206) 575-4420 WI Waukesha (414) 784-8160, (800) 242-6169 WV West Virginia (201) 575-6750 WY Wyoming (800) 525-1274 **INTERNATIONAL: CA Compton (213) 774-7364, Telex**
69-1368, Outside Calif. (800) 421-2250

AZ Phoenix (602) 243-4101, Tucson (602) 624-9986
Alto (415) 968-6292, Sacramento (916) 924-8522, San
Santa Barbara Zenith 20014, Santa Maria Zenith 20014,
CT Wallingford (203) 265-1115, (800) 982-3901
FL Ft. Lauderdale (305) 486-4004, In State (800) 432-8028,
GA Georgia (800) 237-8545 IA Iowa (800) 328-6357 ID Idaho (800) 453-8067, (800) 453-8068
KY Kentucky (312) 640-0200 LA Louisiana (800) 237-8545 MA Billerica (617) 667-8331
(612) 941-7500 MO Maryland Heights (314) 739-0855, (800) 325-1039 MS Mississippi
(800) 237-8545 MT Montana (800) 525-1274 NB Nebraska (800) 525-1274 NC Greensboro (919) 852-9440 ND North Dakota (612) 941-7500 NH New Hampshire (800) 225-0692 NJ New Jersey (201) 575-6750 NM New
Mexico (800) 525-1274 NV Las Vegas (800) 528-4515, Reno (415) 968-6292 NY New York City (201) 575-6750, Upstate (617) 667-8331 OH Cleveland (216) 587-6558, In State (800) 362-1921, Out Of State (800) 321-1436
OK Tulsa (918) 252-7537, (800) 722-3900 OR Portland (503) 641-9150 PA Eastern (201) 575-6750, Western (800) 321-1436 RI Rhode Island (800) 225-0692 SC South Carolina (919) 852-9440 SD South Dakota (612) 941-7500
TN Eastern (919) 852-9440, Western (312) 640-0200, In State (800) 237-8545 TX Austin (512) 835-2090, Brownsville (512) 544-7212, Corpus Christi (512) 884-6167, Dallas (214) 343-2400, Houston (713) 530-7030, Laredo
(512) 726-1697, San Antonio (512) 349-0396, In State (800) 442-1041 UT Salt Lake City (801) 973-6913, In State (800) 662-8630, (800) 662-8631 VA Northern (703) 621-2592, Southern (800) 638-4994 VT Vermont
(800) 225-0692 WA Tukwila (206) 575-4420 WI Waukesha (414) 784-8160, (800) 242-6169 WV West Virginia (201) 575-6750 WY Wyoming (800) 525-1274 **INTERNATIONAL: CA Compton (213) 774-7364, Telex**
69-1368, Outside Calif. (800) 421-2250

KIERULFF, A DIVISION OF DUCOMMUN INCORPORATED

ARE YOU KEEPING PACE WITH THE CHANGING FACE OF DBMS?

**Watch for
Computerworld's
October 31st
Special Report
and get current—
FAST.**

How do you select the right DBMS for your installation? Are you fully utilizing the data base management system you have? Are you aware of the do's and don'ts for success with DBMS? Are you clear on the real benefits of DBMS?

You'll get the answers to these and a great many other questions you have on Data Base Management Systems in the pages of *Computerworld's* October 31st Special Report, "The Changing Face of DBMS." You'll get an examination of the latest market studies regarding DBMS. You'll get a look at the changing role of the data base administrator. You'll read about how microcomputer DBMS products are used for projects within mainframe-oriented DP installations.

And there's more. Lots more. Take a look:

- Trends in DBMS products for minicomputers
- The impact of DBMS on the information center
- New uses for data dictionaries
- The impact of fourth-generation languages on DBMS
- Controlling end user access to the corporate data base

You'll get application stores, case studies, news articles and tutorials in this Special Report. And the topics listed above will bring you right through to articles on installing a second DBMS and managing multi-DBMS shops. From search through set-up to multiple systems — you'll get a detailed look at the whole area of data base management systems.

And if you sell utility software packages, data management systems or data base management systems, here's where you'll find your customers next October 31st — reading *Computerworld's* Special Report on Data Base Management Systems. Your ad in this issue will assure them more complete information on the products in the field. Ad close for this Special Report is October 14th. Call your local sales representative at one of the offices listed below or call Don Fagan, Vice President, Sales and Marketing at 617-879-0700.



COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Boston/Chris Lee, Jim McClure, Alice Longley, (617) 879-0700

Chicago/Newt Barrett, Art Kossack, Chris Lee, Jean Broderick, (312) 827-4433

New York/Mike Masters, Doug Cheney, Ray Corbin, Joan Daly, Fred LoSapio, Gale M. Paterno, (201) 967-1350

Atlanta/Jeffrey Melnick, Mike Masters, (404) 394-0758

San Francisco/Bill Healey, Barry Milione, A.G. Germano, Theodora Franson, Ernie Chamberlain, (415) 421-7330

Los Angeles/Bernie Hockswender, Bob Hubbard, (714) 556-6480

OA Seen Propelling Business Productivity

By Jim Bartimo
CW Staff

BOSTON — By freeing up secretaries to take on executives' administrative tasks, office automation can provide American business with a quantum leap in productivity, according to David L. Shay, an office automation specialist in the New York office of Peat, Marwick, Mitchell and Co.

"All studies show that 20% of managers' time is spent on administrative trivia. We're saying you should bring down those tasks to a lower position," Shay said at the recent International Society of Wang Users' annual conference here. This formula answers the much-asked question of what secretaries will do when their duties are minimized through automation.

Although 85% of the Fortune 1,000 companies have a person or committee in charge of office automation, "one would have thought office automation would have grown faster than it has. [It hasn't grown] because there have been too many over-

lapping layers such as data processing, office automation and telecommunications," according to Shay.

One method to ensure office automation success is to install pilot projects quickly. "Don't do anything that takes more

than three months," Shay said.

"We're recommending you start some high-visibility pilots and get the rhythm going. After that, start your long-range planning," he said.

This type of high-visibility pilot project will bring credibil-

ity to the office automation department.

Credibility can also be achieved by performing cost/benefit ratios, planning for business progress and planning for system integration, Shay continued.

Shay predicted that the successful implementation of office automation and the subsequent downgrading of tedious tasks could result in a productivity gain of 20% to 40%. "One of our clients is currently using a world class benchmarking program to drive his productivity engine," Shay said. "He has found that the five leading Japanese companies turn their inventories on the average of 14 times a year, and he is turning his four.

"Obviously, his company and America are never going to make the quantum leap to meet offshore competition by only improving at 7% or 10% a year," Shay said.

DEC Offers Winny Choice, Cuts WP Price

MAYNARD, Mass. — Digital Equipment Corp. has unveiled a 10M-byte Winchester disk option for its small business computer and has cut the price of the computer's word processing package by 9½%.

The 5¼-in. disk option, designated the RCD51-CA, boasts a storage capacity of 20,000 typed pages. It can be installed by users in the computer's existing system box, a vendor spokesman said.

Meanwhile, the word processing option to the Decmate II small business computer has been reduced to \$995 from \$1,100, the vendor said.

The package reportedly includes list/sort/math and communications bundled with Basic word processing software.

Price on the Winchester disk drive is reportedly \$2,745. It is currently available with delivery time of four weeks from Digital at Maynard, Mass. 01754.

Local Net Helps Micros Share Files, Peripherals

DALLAS — Percom Data Corp. has introduced a local-area network to enable a number of microcomputers to share data files and peripheral devices.

The company's interface card, named Percomnet, carries a Western Digital Corp. WD2840 network control processor chip. The card is initially available for use with the IBM Personal Computer.

Equipped with a 64K-byte first-in first-out buffer, the

network comes with token-passing protocol, up to 254 nodes, signal regeneration at each node and optional on-board encryption for data security. Percom said the network is compatible with Microsoft, Inc. MS-DOS; Digital Research, Inc. CP/M; and Unix operating systems.

The price is \$595 a node. A three-node evaluation kit costs \$1,695. The interface card is available from Percom Data at 11220 Pagemill Road, Dallas, Texas 75243.

Clear Definitions Lacking

Wang Users Given Portrait of DSS

By Jim Bartimo
CW Staff

BOSTON — "Decision support systems don't focus on decisions, they don't support you and they're not systems," Howard Morgan, chairman of the Advanced Office Concepts consulting group, told the International Society of Wang Users here recently.

Speaking at the group's annual conference, Morgan outlined what he believes a decision support system (DSS) should be and how it differs from what the management information systems (MIS)/data processing department offers.

In office automation, DSS provides the bookkeeping necessary to make better decisions. Unlike MIS, it need not concentrate as much on efficiency as effectiveness, according to Morgan.

This bookkeeping function

can allow a business to cut down on its "bureaucratic ratio" — the ratio of how many calls occur internally before a decision can be made and communicated externally. The first step toward this bookkeeping function is the use of data bases, Morgan said.

Another important aspect of decision support is financial modeling, such as the type

done with Visicorp's Visicalc electronic spreadsheet. Because each manager's DSS carries with it a bias from that manager's decision process, Morgan said, "the DSS life cycle is shorter than MIS. These systems should be disposable," he noted. Another weak area of DSS is the user interface. "Today's user interfaces are rude and arrogant," Morgan said.

System Forwards Messages

SUNNYVALE, Calif. — Candela Electronics has developed an office system that automatically forwards messages via a computer printer.

Called the Autotas Corporate Message Center system, it directs unanswered telephone calls to a central location where attendants can enter messages into the computer, a vendor spokesman said.

The system will accept and store up to 10,000 messages of as many as 255 characters on two 5M-byte hard disk drives. Messages are directed to 10½-oz. thermal printers, which print them out in 15-char. lines on 1½-in. paper.

Price ranges from \$35,000 to \$60,000. The system is available from Candela at 550 Del Rey Ave., Sunnyvale, Calif. 94008.

DEC USERS DEC USERS DEC USERS DEC USERS DEC USERS DEC USERS DEC USERS DEC USERS DEC USERS DEC USERS

SATURN-CALC

ELECTRONIC FORECASTING AND FINANCIAL MODELING

Available for immediate delivery

- Provides multiple worksheets in a file
- Outputs ASCII files compatible with WP SATURN and other applications
- Written in assembly language
- Supports most common CRT's — VT100, VT 52, ADDs, Hazeltine...
- Provides help text and prompts
- Supports variable width columns

FOR MORE INFORMATION
CALL
800-328-6145

SATURN SYSTEMS, INC.
6875 WASHINGTON AVENUE SOUTH, SUITE 218
MINNEAPOLIS, MN 55435 • 612/944-2452

DEC USERS DEC USERS DEC USERS DEC USERS DEC USERS DEC USERS DEC USERS DEC USERS DEC USERS DEC USERS

OFFICE AUTOMATION

THE FIRST TRULY LOW COST COLOR TERMINAL.

VIEWPOINT[®]///COLOR

Now you don't need to go in the red to get a color display terminal. You can have a full-size, 13" Viewpoint ///Color terminal for \$1295 (quantity one), which is what some manufacturers want for just monochrome.

Take a look at these vivid business graphics, brilliant charts, and exciting text ideas. With Viewpoint ///Color, you get the faster comprehension and improved retention that color offers, plus all the advanced microtechnology and family compatibility you expect from ADDS.



You can adjust the Viewpoint ///Color tilt-and-swivel screen to make it comfortable to read. Plus there's an adjustable angle keyboard, with a convenient stretch cord, that lets you work on any surface – including your lap. And there's a separate key cluster for fast numeric entry and easy cursor control.

If you've been waiting for the cost of color to come down, your patience has paid off.

Viewpoint ///Color. It can save you a lot of green.

SOMETHING EXTRA IN EVERYTHING WE DO.

Viewpoint is a registered trademark
of Applied Digital Data Systems Inc.

ADDS
Applied Digital Data Systems Inc.

VIEWPOINT[®]///COLOR

Atlanta, GA	(404) 455-9341	Schaumburg, IL	(312) 843-7555
Dallas, TX	(214) 387-2337	Tustin, CA	(714) 730-6700
Palo Alto, CA	(415) 856-0560	ADDS UK	44 01 949 1271
Phoenix, AZ	(602) 968-0950		

Applied Digital Data Systems Inc.
100 Marcus Boulevard
Hauppauge, N.Y. 11788
Tel. (516) 231-5400



Subsidiary
of NCR

Pansophic's Rise Spurred By Focus on Early Goals

By Paul Gillin
CW Staff

OAK BROOK, Ill.— If the potential for big profits and fast growth is the software industry's most alluring benefit, then time is its greatest enemy. Of the thousands of

software packages that have come and gone over the past 25 years, barely a handful have been successfully marketed for more than 10 years. Even fewer have achieved a figure of more than 3,500 installations.

Pansophic Systems, Inc., a \$43-million systems software supplier based here, claims two products in both elite categories. The company's Panvalet source program management and security system is now in its 14th year with more than 4,600 users, and its Easytrieve information retrieval package this year celebrates its 10th anniversary with more than 9,500 licensees, the company claims.

Meanwhile, Pansophic has maintained an average 30% growth rate over the last five years, performance it moved to continue in July with a \$30-million stock offering. Although success this year was marred by legal headaches [see related story], Pansophic is poised to make some major acquisitions within the next 12 months, according to David J. Eskra, president and chief operating officer.



David Eskra

CW Photo by P. Gillin

"Acquisition is a key element in our marketing strategy," Eskra said. "Our business won't change, but we will look at segments of the business we haven't looked at."

Key to Pansophic's steady growth even during the recent recession is a focus on goals set forth as early as the founding year of 1969, Eskra said. "We have historically been involved in application tools geared toward the productivity of people

(Continued on Page 106)

Silicon Valley Seen Beefing Up Security With Cooperative Effort

By Robert Batt

CW West Coast Bureau

PALO ALTO, Calif. — Computer manufacturers in California's highly competitive Silicon Valley have made great efforts to beef up their security in the last year, following a number of well-publicized trade thefts.

This is the impression gathered from recent interviews with a number of security specialists. The consensus is that companies are now far more willing to cooperate with one another over preventing the theft of trade secrets than they were even a short time ago.

"Many companies have upgraded their security, and there is more cohesiveness among both law enforcement agencies and companies themselves," commented Richard Camps, vice-president of Barrick Security Group, Inc., a San Mateo, Calif.-based private security and investigation firm.

Camps, who recently testified before the U.S. House of Representatives Subcommittee on Oversight and Investigation

(Continued on Page 108)

Setting the Table; A High-Tech Sting

By Robert Batt

CW West Coast Bureau

SAN MATEO, Calif. — Richard Camps and Barry Bergman are old pros when it comes to the murky world of the so-called "sting operation."

From their modest one-story office here, 20 miles south of San Francisco, the two former narcotics police officers have established an extensive international network of informants and "operatives" who track the shady dealings of high-technology

(Continued on Page 108)

Conduct Of Salesmen OK, Eskra Says

OAK BROOK, Ill.— "I'm sure some salesmen said some things they wish they didn't, but on the whole they conducted themselves well."

That is the opinion of David J. Eskra, president and chief operating officer of Pansophic Systems, Inc., following the resolution of a lawsuit filed in April against Pansophic by Future Software, Inc., a firm based in Salt Lake City, Utah [CW, April 18].

The \$115 million suit against Pansophic and SGT Corp. was dropped late last month after Pansophic acquired Future Software's marketing rights to SGT, a CICS program development tool. Pansophic paid Future Software an estimated \$1 million to drop the suit [CW, Sept. 5].

Pansophic had paid \$2.4 million for SGT, which it renamed Gener/OL, in 1982. In doing so, it also took over responsibilities for a limited marketing agreement between SGT Corp. and Future Software.

Future Software charged that some Pansophic salesmen subsequently began using marketing tactics designed to dissuade customers from buying the SGT product from Future Software. One user contacted by *Computerworld* called the Pansophic tactics "Mafia-like."

"I said to my sales force, 'If you guys are using Mafia-like tactics, why are we losing customers?'" Eskra chided in a recent interview. "There was a lot of slurring that was going on for a variety of reasons. I think our salesmen are very, very good, and I encourage them to aggressively sell their products."

**With BEALL Directing,
Your
Computers
Never Miss
a Beat**

The Beall Channel Switch. Lets you direct critical on-line services to another CPU at the flick of a switch when failure occurs. Allows specific peripherals serve more than one computer. Redrives all CPU signals to give you far more flexibility for physical placement of peripherals.

And Beall does all of this less expensively, more reliably and with less opportunity for operator confusion than anyone else.

We make five basic models to provide up to eight switchable interfaces each of which can be logically connected to as many as eight CPUs.

Want to learn the whole "score?" It's in our new brochure. Write or call for it today.

John Beall & Company, Inc.

9103 Third Avenue • North Bergen, N.J. 07047 U.S.A. • 201/854-3562



Only Lee Data's Universal Terminal System can satisfy all of your information processing needs... 3270, Async and personal computing.

Finally, there's a single, universal way to satisfy the individual information processing needs of all your people. From sales manager to accountant. From research to production. The Lee Data Universal Terminal System can do it all.

And our system is modular by design to provide you any or all of these cost-effective, problem-solving advantages:

3270-compatibility plus more

Combine complete 3270 system-compatibility with an innovative Lee Data design and you have a System that delivers greater convenience and flexibility.

Our System not only offers standard 3274-compatible local and remote control units, but now also provides combination local/remote controllers with a unique dual-host access capability.

In addition, you can choose from a full line of terminal capabilities, beginning with our cost-effective 3178-compatible display on up to our popular All-In-One Display which offers, in a single unit, four selectable screen sizes—including 132-column—a great advantage in program development, spread sheet applications and many others where flexibility is required.

3270-plus-Async: another cost-effective advantage

If your application needs currently find you switching between 3270 and VT100-style terminals to get the job done, Lee Data has a better way.

As part of our System, you can enjoy the further advantage of a 3270/Async capability that allows dynamic selection of 3270 and VT100 operating modes from a single Lee Data display. A simple command entered at the keyboard provides you access to applications

running on an IBM CPU, non-IBM systems (such as DEC, H-P or Prime), as well as timesharing services. Another Lee Data solution to simplifying your company's terminal network.

And now integrated personal computing too

That's right! Now our System also includes a sophisticated personal computing package that can easily be integrated into an existing Lee Data 3270 system.

With our approach, you get continued interactive access to host-based files, plus all the advantages of

professional business computing from the same Lee Data workstation.

Advanced features include a host file transfer capability, a single-board design, four standard system expansion slots and, of course, complete IBM-compatibility.

All these additional capabilities plus the same user-friendly Lee Data displays.

Plus these added benefits...

To any Lee Data System, add our unique Coax Eliminator products and realize additional savings of up to 85% in cabling costs alone.

Combine this with all the outstanding features already mentioned and you'll find a System offering everything you need for efficient, cost-effective operation.

Discover the advantages of our Universal Terminal System for yourself. For more information, call our system specialists toll free:

**Designers of innovative systems
for the information worker**

LEE DATA CORPORATION

7075 Flying Cloud Drive
Minneapolis, MN 55344
TWX 910-576-1690

800/328-3998



To Handle New Product Offerings

NCR Unveils Plan to Hire 500 Sales Reps by '84

By Bill Laberis

CW Staff

DAYTON, Ohio — Banking both on widespread customer acceptance of its new products and on a restructured sales and marketing organization, NCR Corp. has announced it will hire an additional 500 sales representatives by year's end.

A company spokesman declined to say by what factor the 500 new hires will increase NCR's sales force, except to state the increase is "very significant." It is believed the company's present sales force is comprised of about 7,500 people.

The Dayton-based computer maker has officially launched its sales recruiting drive, targeting college-level graduates in computer science and business-related fields. NCR has established job centers in major U.S. cities to aid in the hiring effort, dubbed "Opportunity '83."

"We are looking for college graduates with a demonstrated high level of academic achievement," said Paul W. Lappetito, senior vice-president of NCR's U.S. Data Processing Group. Lappetito said that candidates favorably interviewed at the job centers will be made same-day offers, then placed in a six-month training program at the company's educational facilities.

Unlike most of its competitors in the non-IBM mainframe world, NCR managed to sail through the recession in reasonably good shape. Sales in 1982 increased 3% to \$3.5 billion, while profits rose 13% to \$234 million or \$8.75 per share. The company's performance has continued strong into 1983, with profits in its most recent quarter up 16% to \$69 million on a 7% increase in sales to \$932 million.

Asset Management Emphasis

The recent financial results reflect in part a business strategy hatched in 1981 to reduce equipment inventories, improve manufacturing and, in general, gain better control over costs. This strategy continued into 1982, as the company placed further emphasis on asset management.

This strategy also saw the company breach new market areas. In 1981, the company announced its entrance into the semiconductor market, and late last year a subsidiary, NCR Comten, Inc., announced the capability of making its front-end processors compatible with Digital Equipment Corp.'s computers.

In May the company entered the telecommunications services market by forming NCR Telecommunications Services, Inc. And in a joint effort with Intel Corp., NCR developed a system to transmit data among computer terminals which is cheaper but slower than Xerox Corp.'s Ethernet, according to Newton-Evans Research Co., a Sykesville, Md. industry research firm.

On the marketing front, NCR this fiscal year announced a restructuring of its sales force, whereby at least one vertical market will be included in each of the company's three marketing groups. This system replaces a structure based around geographical territories. The restructure also creat-

'NCR is doing much better these days because they are doing better market research, then responding with product development efforts. They are also focusing more on retailing, their greatest strength.'

— Charles Newton, president Newton-Evans Research.

ed the Customer Services Division, providing hardware and software support to NCR's installed base.

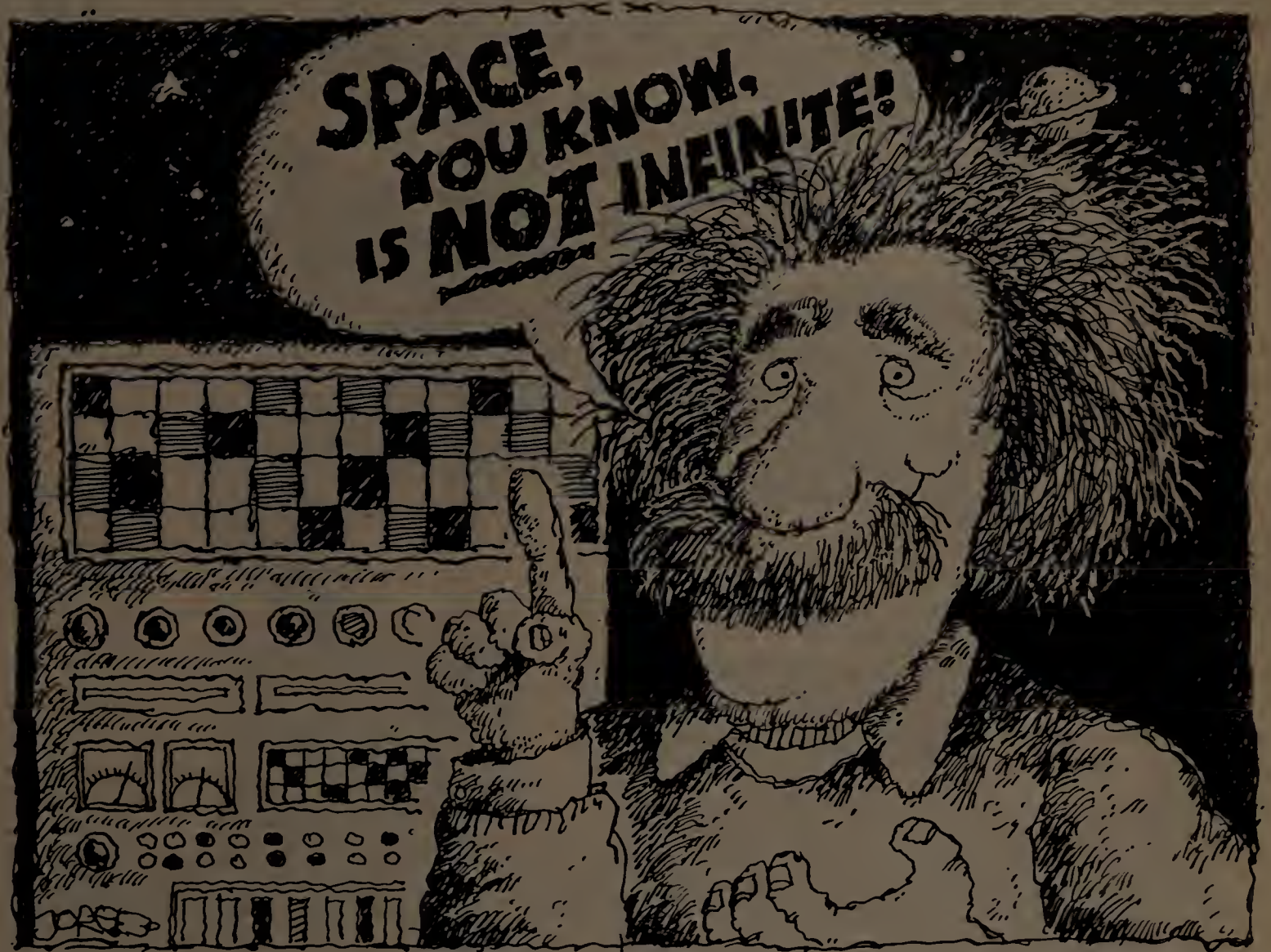
But it is to market the plethora of new product introductions announced in the last 24 months that the new sales people will be concerned with. The company is replacing its entire line of V-8500 M and MP computer systems with the 8600

series, targeting NCR's traditional strengths in transaction processing. Seven new models in this line were announced last May.

In the beginning of fiscal 1983, the company entered the personal computer market with its Decision Mate V series, designed around industry standard hardware and software subsystems for business and

professional users. The Decision Net local-area network was also announced in conjunction with NCR's micro thrust.

"I'd say their microcomputer focus has to be one of NCR's strong suits at this time, particularly in the vertical markets where NCR is very strong," said Charles Newton, president of Newton-Evans Research. "There are problems with profitability in the low end, although the company has a sizable installed base in which to sell its new [microcomputer] products." At the high end, NCR this year introduced a 32-bit mainframe based on its very large-scale integration technology, the 9300 series.



Disk Space Running Short On Your VAX? Archiver Is the Answer.

Archiver, Strategic Information's proven archive-and-retrieval package that reduces your storage costs, is an attractive alternative for every VAX system manager faced with the burden of adding additional disk drives. Archiver allows you to migrate selected files from expensive disks to cost-effective tape with minimum operational impact while retaining file availability on demand.

Notable features of Archiver include...

- An on-line directory of archived files for each user.
- Easy user interface implemented as DCL commands.
- Support for all VMS file structures.
- System manager option to automatically migrate user files to archive storage.
- Automated operator interface.
- Optimal tape capacity and throughput via unique access method.
- Insurance against tape failures through redundant use of tapes and error detection.

Available immediately for VAX/VMS systems, Archiver is the automated answer to your storage requirements that also allows you to control storage costs. To find out more, please call or write us at the address below.



Computer Services Group
STRATEGIC INFORMATION
80 Blanchard Rd.,
Burlington, Mass. 01803,
617/273-5500

Taking Care of Business.

YES, I'd like to know more about how Archiver can help us control storage costs.

NAME _____

COMPANY _____

ADDRESS _____

CITY STATE ZIP _____

PHONE _____

Mail to: Computer Services Group, Strategic Information,
80 Blanchard Rd., Burlington, Mass. 01803

Stop by and see us (Booth #1118) at DEXPO™ West 83.

Archiver is a trademark of Strategic Information, a division of Zett Davis Publishing Company. VAX and VMS are registered trademarks of Digital Equipment Corporation.

WHAT'S THE FUTURE OF MICROS IN YOUR ORGANIZATION?

Turn to "The Micro Mission" this fall and get the future mapped out for you.



What's the future of Micros in your organization? Turn to "The Micro Mission" this fall and get the future mapped out for you.

This November, *Computerworld* will give you an Extra! you can't afford to miss. Not if you plan to take advantage of the hundreds of possibilities micros give you. You'll get articles, interviews, applications stories, tutorials, market data, and advice from the experts — a whole issue of *Computerworld Extra!* devoted to "The Micro Mission." And it will come in the mail at the end of November as a bonus issue! You don't have to do a thing. Just look at what's coming to you:

You'll get an examination of the politics of microcomputers in organizations; a roundtable discussion by DP/MIS experts dealing with a wide range of topics relating to personal computers — from selection to implementation. And, there'll be a whole article devoted to how large companies deal with training personnel to use personal computers.

You'll get articles on:

- The types of peripherals available for setting up an overall system
- Word processing software for personal computers
- An evaluation of spreadsheet software for personal computers
- Networking personal computers into the corporate database
- Maintenance, service and support policies of vendors
- Database management systems on personal computers

And there'll be a special profile of an operating information center where employees are trained on the use of personal computers. You'll see how they're helped in selecting the right product for their needs and how they're aided in implementation and ongoing training. You'll also get a look at the financial ins and outs of the market, pros and cons of personal computers replacing CRTs, and . . . you get the idea. You're going to get a whole issue packed with news on micros you can't afford to miss.

And if you sell micros and micro products, you shouldn't miss this opportunity of having your product represented in this *Computerworld Extra!* issue that will be saved and used as a reference. The deadline for ads is October 21. To get your space reserved, call Don Fagan, Vice President Sales/Marketing at (617) 879-0700 or call your local *Computerworld* sales office, listed below.

Sales Offices

- Boston** _____
Chris Lee, Jim McClure, Alice Longley, (617) 879-0700
- Chicago** _____
Newt Barrett, Art Kossack, Chris Lee, Jean Broderick, (312) 827-4433
- New York** _____
Mike Masters, Doug Cheney, Ray Corbin, Joan Daly, Fred LoSapio, Gale M. Paterno, (201) 967-1350
- Atlanta** _____
Jeffrey Melnick, Mike Masters, (404) 394-0758
- San Francisco** _____
Bill Healey, Barry Milione, A.G. Germano, Theodora Franson, Ernie Chamberlain, (415) 421-7330
- Los Angeles** _____
Bernie Hockswender, Bob Hubbard, (714) 556-6480



COMPUTERWORLD

9. 5

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
375 Cochituate Road, Box 880, Framingham, MA 01701/(617) 879-0700

To: Don Fagan

Vice President Sales/Marketing
CW Communications/Inc.
375 Cochituate Road
Framingham, MA 01701
(617) 879-0700

- ☐ Please send me advertising information on your Micro Extra!
☐ Please have a sales representative contact me.

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Telephone _____

Mass. Bill Would Protect Intangible Material

By Peter Bartolik
CW Staff

BOSTON — A law to extend trade-secret protections to intangible material has received initial approval from the Massachusetts House of Representatives here.

The legislation would broaden a law enacted in 1967 that was aimed at protecting trade secrets but was limited to tangible or physical materials. The new bill was filed by Rep. W. Paul White (D-Boston) on behalf of the Associated Industries of Massachusetts (AIM), a cross-industry lobbying group and sponsor of the original law.

"This would not stymie employee mobility," AIM General Counsel William J. McCarthy told *Computerworld* in a recent interview. "There are many steps and criteria a company must follow before the law can be invoked," he added.

Essentially, the bill would extend to intangible material the three remedies currently provided companies for protection of tangible trade secrets. Those remedies, according to McCarthy, are: provision for a criminal charge of larceny; civil court action providing for the awarding of double monetary damages; and the ability to seek injunctive relief from a judge.

Wang Labs Sells Its 4.3% Stake In Tymshare

LOWELL, Mass. — Ending speculation that an unfriendly takeover was in the works, Wang Laboratories, Inc. this month sold its 4.3% stake in Tymshare, Inc., canceling previously announced plans to acquire a larger stake in the value-added communications reseller.

The sale of some 531,000 shares of Tymshare was followed by another announcement of a \$10 million agreement with the packet-switching firm of Bolt, Beranek and Newman of Cambridge, Mass., whereby Bolt will design and install a wide-area network built around its latest packet-switching technology.

Beyond initial usage of the wide-area network in the company's internal management information requirements, Wang said it plans to expand this capability in the future to provide value-added communications services to its customers. It was this capability that some analysts speculated Wang sought with the purchase of Tymshare stock.



Where's This Office Automation Going to End?

McCarthy said the legislation would codify a decade's worth of case law handed down by this state's top court, the Supreme Judicial Court. That court, he added, has established various procedures that must be followed by companies to ensure that employees are aware that materials are the property of the employer.

Computer law expert Robert Bigelow, a partner in the Woburn, Mass., firm of Bigelow and Saltzberg, said the determination of whether intangible materials actually belong to an employer or employee would depend on the manner of their working arrangement.

"Generally, the inventions of an employee who is hired to invent and

that fall within the scope of the company's business belong to the company," Bigelow said last week. "The inventions of an employee developed on his own time and in an area not within the company's business will belong to the employee."

However, he noted, there is "a middle ground" where an employee develops an idea on his own time but within the scope of his employer's business. "That sort of balances to the employer if [the individual] is an inventing employee," Bigelow said, adding that many companies require their employees to sign agreements specifying employer rights.

People leaving an employer to start up their own firms should check with a lawyer "to find out

what the rules are," Bigelow said. Legal advice is useful both to determine who owns the rights to ideas and to determine if an employer-employee agreement is proper and legally enforceable, he said, adding that some agreements go beyond the law and can be either restricted or tossed out by a judge.

AIM's McCarthy said the law's protection is not limited to high-technology industry. "There has been a tremendous surge in valuable research and development activity in Massachusetts, not only in high tech, but in the more mature industries as well," he said.

The bill faces two more votes before the House before it can be sent to the state Senate.

DISCOVER THE DYSAN DIFFERENCE

A FREE GIFT From Dysan With The Purchase of 50 Diskettes

For A Limited Time Dysan Offers You a Bonus Package: 50 Diskettes and a Free Premium of Your Choice. Select From . . .

- A Dysan 50/File, the ideal portable protection for your diskettes.
- A PerfectData™ head cleaning kit, complete with supplies for 26 applications.
- A pair of IBM System 34/38 8-inch diskette auto load magazines.

Here's All You Have To Do:
Contact your local participating Dysan dealer. If there's not a dealer in your area, send in the coupon below or call us direct at 800-551-9000, Dept. 50 and ask for the Dysan Bonus Package Promotion. With every Dysan Diskette Bonus Package you purchase, you receive 50 Dysan double-density flexible diskettes (8-inch or 5 1/4 -inch, single- or double-sided), plus your choice of one of the three premiums listed above. Precision Dysan diskettes, and a free premium. That's a Great Deal!

Bonus packages are limited to a minimum of 50 diskettes of the same type and size. Offer expires October 31, 1983. IBM magazine offer good while supplies last.

Dysan
CORPORATION
Corporate Headquarters
5201 Patrick Henry Drive
Santa Clara, CA 95050
(800) 551-9000

CW 9/26/83

Don't Pass Up This Great Deal From Dysan.

For your Great Deal, contact your local Dysan Dealer. For the name of your local dealer, call Dysan at 800-551-9000 or send us this coupon. And we'll get back to you. Dysan, show me how to get a great deal on these diskettes:

- ☐ 8-inch single-sided, double-density
- ☐ 8-inch double-sided, double-density
- ☐ 5 1/4 -inch single-sided, double-density
- ☐ 5 1/4 -inch double-sided, double-density

Send to: Dysan Corporation, 5201 Patrick Henry Drive, MS 0114, Santa Clara, CA 95050
ATTN: Dealer Program Manager.

DEALERS INQUIRIES ON DYSAN'S NEW DEALER PROGRAM ARE NOW BEING ACCEPTED. DON'T MISS OUT ON THIS GREAT OPPORTUNITY

Name: _____ Title: _____
Company: _____
Address: _____
City: _____ State: _____ Zip: _____
Telephone: _____

Know Limitations and Goals, Pansophic Exec Advises

OAK BROOK, Ill. — The key to navigating a small software company successfully through the choppy waters of competitive business is to know your limitations and your goals equally well.

That is the advice of David J. Eskra, president and chief operating officer of Pansophic Systems, Inc., a \$43 million systems software firm based here. Formed in 1969 with four employees and \$100,000 in financial support, Pansophic today employs 430 people and is one of the top 10 money-makers among independent software vendors.

The company has achieved impressive growth and profit figures while pursuing markets that were defined in the very early days of its

existence, Eskra said. That philosophy of doing one thing well has become paramount for small companies as the software market has become more crowded, he noted.

Asked to identify the key ingredients in Pansophic's success, Eskra cited the "vision and stubbornness" of Pansophic founder and chairman Joseph A. Piscopo, who started Pansophic at the age of 23. "He's very single-purposed in his mind set and he has never changed his belief that

products like Panvalet and Easytrieve would satisfy a demand," Eskra said. "You'll find that what it takes to sell Panvalet today really hasn't changed that much" from 13 years ago.

To get a software company moving today requires "a real firm idea of what you want to do" and a knowledge of the skills that got you to the first stage of success, Eskra said. Equally important is "not to think that because you sell one kind

of software you can sell all kinds of software," the Pansophic president said. "If you're a salesman, don't try to be a technician, and if you're a technician don't try to be a salesman."

But when the chance to grow comes along, don't be afraid to explore new avenues, Eskra said. If building a business isn't your life-long goal, Eskra offered another alternative. "Develop a great product, and call me," he said.

Pansophic's Products Survive Test of Time

(Continued from Page 101)
who interact with computers, whether end-users or programmers," he

said. "We define ourselves as an application development systems vendor."

Eskra, whose Mercedes Benz sports an "EZT" license plate in deference to the company's most popular product, said that the company has strayed little from the intentions set forth in those early years. Following an aborted foray into packaged applications with Panrisk, introduced in 1980, and flirtations with consulting, Pansophic is now seeking to strengthen its grip on the application development field. Last year it acquired three products: O-W-L (On-Line Without Limits), a design, development and library management system; MIS/OL (Management Information Systems/On-Line), a source program development and maintenance tool; and Gener/OL (Generation/On-Line), an end-user-oriented IBM CICS application generator.

In some cases the new products compete with current Pansophic batch offerings, but the on-line distinction is an important one, Eskra said. "Last year we went from 0% to 5% [of revenues] in on-line products compared to a plan of 3.5%," Eskra said. "Easytrieve [a batch product] revenues are stabilizing now, which we knew would happen. But on-line has created a new level of demand."

The software industry has answered that demand with a bevy of products that promises to ease the programming burden by generating code and off-loading some applications programming to users. The industry has also seen a flurry of activity in the area of user-friendly relational data base management systems (DBMS) and in tools linking microcomputers to mainframes. In response, Pansophic is again taking a hard look at products that fall outside its traditional areas of expertise, but only at those that "have a high perception in the market," Eskra said.

A Pansophic DBMS, "is not out of our realm of thinking," he noted.

However, Pansophic has no plans to enter actively into the micro software market, Eskra emphasized. "We don't think [IBM Personal Computer] capability will get people to buy Pansophic because they can get essentially the same capability [on our products] with an intelligent [IBM] 3270 terminal," he said.

"We will have Pansophic products operating on [Personal Computers] and try to develop a technical link to the mainframe," he said. "The [Personal Computer] today is a single-purpose acquisition that people buy because they want to get to a little piece of data. Our business is big corporate data bases."



The Harvard of software education.

If you program large-scale computers, you know how much you have to know—and how much you have to keep on learning—to do your job well.

So going back to school every couple of years makes obvious good sense. The question is, where?

The answer is, "Amdahl Ed."

Ask a grad, and you'll hear that Amdahl's Education Centers are the industry's best. The curriculum is uniquely comprehensive, the instructors especially skilled.

They not only know their subjects, they know how to teach them. They're technical

experts who can communicate their expertise.

They prefer informal, two-way Q&A's to starched-collar lectures and practical, hands-on training to theoretical deliberations.

So you learn a lot you can use...fast.

Our current curriculum includes courses on MVS, VM, data systems and communications systems. A copy of our catalog is yours for the asking.

Just call toll-free 800-538-8460 x. 6393 (in California 408-746-6393), or write c/o Amdahl National Education Center, P.O. Box 3470, MS303, Sunnyvale, CA 94088-3470.

the amdahl phenomenon

In October, 1970, a company was formed expressly to build one product: A mainframe computer that would outperform the mainframe that owned the market at that time. Today, this company is an international success story, a phenomenon.

21 MIPS—Move over VAX and MV/10000, the fast lane belongs to Perkin-Elmer.



© 1983 The Perkin-Elmer Corporation

The benchmarks are in. Perkin-Elmer has won again—by executing 21 MIPS on our Model 3200MPS with a sustained I/O bandwidth of 40 MB/sec.

King of the road

Consider this. The VAX 11/780 can execute 1.2 MIPS. The Eclipse MV/10000 fares a little better at 2.5 MIPS. But the Perkin-Elmer 3200MPS gives you a plug-in parallel processing system that starts at 3 MIPS and can be expanded up to an astonishing 21 MIPS.

Maneuverability

The Model 3200MPS gives you new freedom in estimating jobs that are difficult to size. You can start with a 3 MIPS processor priced at only \$150,000. Then, as your needs grow, you can add anywhere from one to nine Auxiliary Processing Units (APUs) at an extremely

affordable \$35,000 each.

Automatic shifting

The Model 3200MPS is designed to handle demanding real-time applications as well as heavy streams of independent number-crunching tasks. You can segment your application into multiple task modules, with each APU performing a set of related functions.

Our virtual task manager gives you full virtual capability without the virtual overhead.

Ease of handling

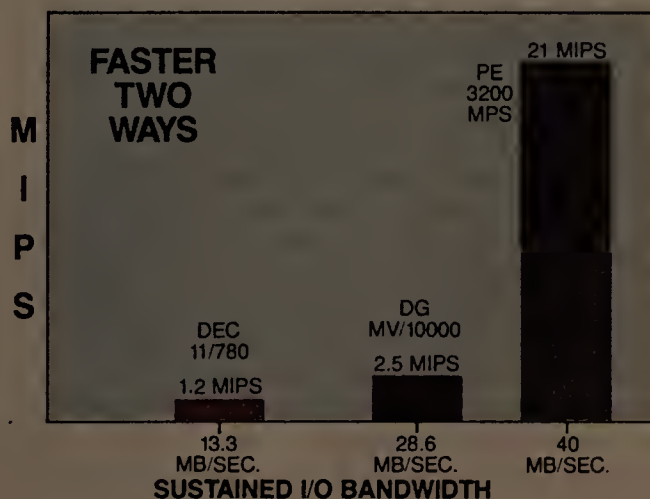
The Model 3200MPS provides maximum flexibility for software development, system maintenance, and system extension.

Our state-of-the-art universally optimizing FORTRAN VII Z enables you to use the latest modular programming techniques for increased programmer productivity while maxi-

mizing real-time efficiencies.

The Model 3200MPS can be structured to permit continued system operation though one or multiple APUs may fail.

To find out more about 21 MIPS mainframe-style crunching on our Model 3200MPS write or call today: The Perkin-Elmer Corporation, Two Crescent Place, Oceanport, NJ 07757. **Tel: 800-631-2154.** In NJ 201-870-4712.



PERKIN-ELMER

Undercover Duo Stings High-Tech Gangsters

(Continued from Page 101)

ogy gangsters.

Concentrating, in particular, on the "gray" market, so-called because it combines both legitimate and illegal trading in semiconductor devices, Camps and Bergman conduct undercover sting operations for clients in which they sell purportedly stolen goods to suspected thieves in a bid to draw out the ring leaders.

Their sources include regular business contacts, law enforcement agencies and even members of the underworld.

"Our job is to identify the perpetrator. We prefer to work on the outside of a company first, and often we use a plant operative who can supply inside information and send it back to us. Our aim is to find out who is financing the illegal activity," explained Bergman, who declined to be photographed.

Having identified the culprit,

Silicon Valley Beefing Up Security Steps

(Continued from Page 101)

tions, said computer manufacturers are now more willing than they used to be to prosecute the theft of proprietary information or hardware.

"High technology firms are becoming increasingly aware of the potential damage that a breach of security can do to their business. As a result they are becoming more unified in creating and enforcing laws in partnership with other companies or government agencies," said Douglas Southard, supervising attorney for the District Attorney's Technology Theft Association (Data), in Santa Clara, Calif.

As an example, Southard cited the recent lobbying of Congress by the major semiconductor manufacturers for copyright protection in the design of integrated circuits. "It was only a few years ago that the major companies were at loggerheads with each other over this issue," Southard recalled. "Now they realize it is in their enlightened self-interest to have this kind of security."

Data, an association comprising 25 detectives from local police forces, the Federal Bureau of Investigation, U.S. Customs Service and the Santa Clara County Sheriff's Office, specializes in tracking down criminals working in areas such as stolen chips and trade-secrets theft.

According to Southard, there appears to have been a significant drop in the number of thefts in hardware components such as integrated circuits, disk drives and diskettes.

"The theft of proprietary information is our main problem now," Camps observed. Closer screening of personnel, more stringent verification of previous employment and a tighter check on employee resumes will help to reduce trade-secrets thefts, he said.

Camps, a former intelligence officer in Latin America with the Drug Enforcement Administration, said the weakest point in a computer manufacturer's security is its people.

Camps and Bergman then pose as criminals dealing in stolen merchandise.

Camps recently told a House of Representatives subcommittee: "The trade in stolen electronic merchandise is both extensive and lucrative. There are sophisticated national and international networks involved in this activity, and there are several electronics companies in northern California that are generally considered to be fronts for the Soviet Bloc countries."

The distribution network, he told the congressmen, is the key element in this market. Without this link, he asserted, the thieves would find it very difficult to dispose of stolen goods, and buyers would be very

hesitant to deal directly with the suppliers.

Camps described to the committee a recent case in which a south San Francisco businessman named Barry Ching-bor Poon was arrested for dealing in stolen integrated circuits. When arrested, Camps said, police found Poon's residence literally crammed with 75,000 integrated circuits valued at between \$200,000 and \$300,000. Camps and Bergman had sold many of these chips to the alleged thief as part of an undercover operation.

The chips, Camps claimed, were due to be shipped to Poon's brother in Hong Kong, where they were targeted for sale to manufacturers of counterfeit Apple Computer, Inc.

personal computers. As part of the sting, the two agents negotiated with Poon and his brother for the importation from Hong Kong of large quantities of counterfeit Apples.

"In exchange for a preferential price and the promise of a steady supply of chips in the future, the Poon's offered us a good deal on the counterfeit Apples — \$300 per unit delivered," Camps told the committee.

These facts, said Camps, suggest that Poon was part of a network that purchased stolen chips in California, shipped them to Asia for use by counterfeiters of Apple and other computers and assisted the sales and distribution of the counterfeit merchandise back in the United States.

BEFORE YOU INVEST IN PAYROLL CHECK THE INSCI

**Dedicated exclusively
to computer-based
payroll/personnel management.**

**Fully integrated, native database
systems and true on-line,
real-time interactive VSAM.**

**Most experienced.
Started the industry
in 1965.**

**Delivered over \$100
million in computerized
Payroll/Personnel Systems.**

**The choice of two
powerful options:
Software and Service.**

Note: InSci systems operate in IBM 370, 43XX, 30XX and compatible environments, and are TP monitor independent.

Aimed at Regulating Business Relations Dealers, Suppliers Contest Terms of Legislation

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — Representatives of computer and office equipment manufacturers squared off against business equipment dealer spokesmen at recent Senate hearings on legislation to regulate business between the two groups.

The proposed legislation, the Office Machine and Equipment Dealers Act, prescribes "good-faith" business practices the manufacturers must follow and sets termination procedures for dealer contracts. Its sponsors contend it will limit abusive and unfair treatment of the usually small dealer organizations by the often large and

"The bill 'would effectively remove the threat to dealers of large, primarily foreign suppliers, whose predatory actions have been responsible for countless bankruptcies and financial loss in this high-tech, service-oriented industry.'"

— Sen. James J. Exxon

powerful manufacturers.

Sen. James J. Exxon (D-Neb.), who introduced the bill early this year, said it "would effectively remove the threat to dealers of large, primarily foreign suppliers, whose predatory actions have been responsible for

countless bankruptcies and financial loss in this high-tech, service-oriented industry."

During the Sept. 14 hearing of the Senate Commerce, Science and Transportation Subcommittee on Consumer, Exxon said the legislation

was aimed at foreign firms, but for legal purposes, it had to be written to include all equipment manufacturers. He also emphasized that the bill, in mandating fair and equitable contracts for dealers, does not include any provision for federal oversight of such contracts.

A parade of equipment dealers and their representatives urged congressional passage of the legislation. Richard P. Nelson, president of Ohio Business Machines, Inc., Cleveland, and a member of the National Office Machine Dealers Association (Nomda), complained of "the manufacturer's dictatorial power over dealers." According to the dealers, the greatest problems involve foreign — particularly Japanese — suppliers.

The situation has developed, several people said, because the Japanese have become such dominant suppliers of business and office equipment. Nomda President John J. Kuchta told the subcommittee that dependence on foreign products without alternative sources of supply has resulted in these manufacturers acquiring inordinate bargaining power.

"Despite several years of attempted negotiation with the 'source of power,'" he continued, "one-sided dealer agreements are still offered on a 'take it or leave it' basis, unfair quotes are still being set and product performance is still poor. It seems that the response of these foreign suppliers is clear: They have the power to dictate the terms of their relationships with dealers and plan to continue to do so."

Representatives of U.S. manufacturers, however, argued the bill is unnecessary because existing contract law is sufficient to protect dealers, because the bill is so vaguely worded that it will result in excessive litigation and because the dealers' problems are limited and thus do not require legislative redress.

IBM Vice-President Terry Lautenbach said the bill "assigns very generous rights to office equipment dealers and places very onerous responsibilities on office equipment suppliers without spelling out the rights or duties of either one very clearly." He added that the bill would be anticompetitive.

Similarly, Jack Biddle, president of the Computer and Communications Industry Association, said the bill "would lead to further erosion of America's world leadership position in high-technology products. It would deny U.S. consumers the freedom of choice in product selection they now enjoy and would force them to pay higher prices for those products which they could purchase."

The bill was also opposed by the Consumers Union, the Coalition for Competition and, very strongly, by the Federal Trade Commission (FTC). FTC Commissioner George W. Douglas said that because existing law "more than adequately protects dealers" and because the bill "may be anticompetitive ... there is no sound basis for enacting this legislation."

PAYROLL/PERSONNEL SYSTEMS, A DIFFERENCE

INSCI

Maybe it's not fair to compare anyone else to InSci. After all, we do have some unfair advantages: InSci invented the computerized payroll/personnel industry in 1965. So we have a head start.

All of our people—every one of them—is dedicated solely to putting the computer to work to help Payroll/Personnel professionals do their jobs more effectively and cost-efficiently. We have no other business, unlike our worthy competitor, the generalist. Our expertise has enabled us to provide the industry's only true native database systems. The competition offers resource-robbing interface systems. The fact is, we're the world's largest specialist in automated payroll/personnel systems. Our systems and services have benefited 50 Fortune 100 corporations, 45 of the 125 largest banks in the U.S., and nearly 1000 companies worldwide.

Before you invest in a payroll/personnel system, it will pay to check the InSci Difference—the leadership difference. Start by sending us this coupon. Or just call Christine Hanavan at (201) 391-1600.

Christine Hanavan

Information Science Incorporated

95 Chestnut Ridge Road,
Montvale, New Jersey 07645

YES, I want to know more about the InSci Difference
in payroll/personnel systems. Send me more information.

Name

Title

Company

Address

City

Phone

State

Zip

C92683

InSci

#1

VISICALC[®]

For TSO or VM/CMS

DYNACALC^{T.M.}

TEN TIMES FASTER THAN COMPETITION!

- Double storage capacity (Data compression)
- More mainframe features
- External file support

For a 30 day free trial call:

(312) 525-6400

[priced per site, not CPU]

* Visicalc is a registered trademark of Visicorp. Visicorp is not associated with Dynacalc.
** Dynacalc is owned by Dynasoft Corp.



738 N. LaSalle St.
Suite 2
Chicago, IL 60610

Supershorts

Nippon Telegraph and Telephone Public Corp. (NTT) is now accepting applications from U.S. companies for the research and development of digital subscriber loop multiplexing and transmission equipment. NTT is seeking equipment that multiplexes up to 64 digital subscriber circuits per system and connects them to a digital local switching system through a 6.3M bit/sec digital transmission line.

* * *

Anacomp, Inc. has announced an agreement to provide transaction switching and processing services for the Michigan-based Magic Line shared electronic funds transfer network beginning in early 1984.

* * *

The Business and Consumer Com-

munications Division of ITT Telecom Products Corp. has been awarded a contract to supply multiline key telephone systems and single-line telephone sets to Pactel Communications Systems, a subsidiary of the Pacific Telesis Group. The value of the contract was not disclosed.

* * *

Altos Computer Systems, Inc. has introduced Altos Express, a support program for Altos dealers that includes sales leads, analysis of competitive equipment, hardware and software descriptions and product and price updates.

* * *

Wang Laboratories, Inc. will manufacture its Professional Computer microcomputer line for the European market at its new plant on the Stirling University campus in Scotland. The first phase of the plant includes 5,000 sq ft of production facilities. Construction of an additional 125,000 sq ft will begin next year, and when fully operational, the plant will employ about 700 people.

* * *

Digital Equipment Corp. and Scientific Calculations, Inc. will cooperatively market Scientific Calculations' Microelectronics Design System (Meds) software on DEC's VAX-11 32-bit superminicomputers. Developed for designers of very large-scale integration (VLSI) circuits, Meds automates the layout of gate arrays, cell-based integrated circuit designs and fully customized VLSI.

* * *

IBM has announced a new authorization program that permits qualified retail software stores to sell IBM Personal Computer software, expanding the availability of software for the IBM Personal Computer and the Personal Computer XT. Previously, only authorized IBM Personal Computer retail dealers, IBM Product Centers and IBM marketing representatives could sell the software. As part of the program, several locations of Software Centers International have been designated authorized Personal Computer software dealers.

* * *

Dataproducts Corp. has consolidated two divisions, Integral Data Systems, headquartered in Milford, N.H., and the Serial Printer Division, based in San Jose, Calif., into a new organization — SPG. August P. Klein, formerly president and chief executive officer of Integral Data Systems will head SPG as group vice-president. Integral Data Systems became a wholly owned subsidiary of Dataproducts in April.

* * *

Harris Corp. plans to build a new 230,000 sq-ft plant in Malabar, Fla. Ground breaking for the \$20-million facility is scheduled for the fall, and construction should be completed a year later. The Malabar plant will be used for manufacturing, assembling and testing advanced information processing and communication systems for the U.S. government. The first systems to be transferred to Malabar will include the Harris Emux (electrical multiplexer) system for the B-1 bomber and GMF (ground mobile forces) satellite terminals for the U.S. Army.

SEE IT ALL

HARDWARE, SOFTWARE...

Nothing reflects the changing face of the computer industry more accurately than COMDEX.

COMDEX is the computer event designed exclusively for independent sales organizations and your manufacturers and suppliers.

1400 EXHIBITORS...

This year over 1400 exhibitors will showcase the full range of computers, software and related products and services. In the area of software alone, nearly 300 companies will be represented.

55 CONFERENCE SESSIONS...

It's the only event with a rich tradition for providing a comprehensive Conference that is totally focused on ISO problems, productivity and profitability. At COMDEX/Fall '83,

150 experts will present 55 informative seminars.

COMDEX knows ISOs are business people anxious to establish new relationships and solidify the old in our fast changing and increasingly competitive industry.

Because in the computer industry, staying on the forefront is important.

What's new today may be outdated tomorrow.

And COMDEX is the one show that allows you to build, expand and strengthen your entire product line.

PRE-REGISTER TODAY...

This year's show has been expanded to five full days to enable you to see it all. Pre-register for COMDEX/Fall '83 today and take part in the world's foremost computer event. Call our Registration Department at (617) 449-6600.

COMDEX[™]/Fall '83

November 28 to December 2, 1983
Las Vegas, Nevada

For more information, call or write: COMDEX/Fall '83, ISO Registration,
300 First Avenue, Needham, MA 02194 • (617) 449-6600

Presented by THE INTERFACE GROUP, Inc., world's leading producer of computer conferences and expositions including COMDEX/Fall, COMDEX/Europe, COMDEX/Spring, INTERFACE, FEDERAL DP EXPO and the nationwide COMPUTER SHOWCASE EXPOs.

Trilogy Story Shows Risks of Start-Up Efforts

By Robert Batt

CW West Coast Bureau

CUPERTINO, Calif.— The recent announcement by Trilogy Ltd. that it is seeking public financing two years before its first product goes to market underscores the risks involved in developing a new technology through a start-up enterprise.

This is the common response of industry analysts and Trilogy officials alike to the company's plan to offer six million common shares on the open market at between \$12 and \$15 per share, thereby reaping between \$72 million and \$90 million.

"The market is still relatively buoyant, and although Trilogy has raised a lot of money in private financing, it is spending it very quickly, particularly on research and development. The only way it can raise the money it needs is to go public," commented Greg Kelsey, senior technical analyst at the San Francisco investment firm of Hambrecht and Quist.

License Deals

Trilogy, founded by ex-Amdahl Corp. chairman, Gene Amdahl, and his son, Carlton, recently raised \$77 million through deals to license its technology with Digital Equipment Corp., Sperry Corp. and CII-Honeywell Bull of France. However, noted Kelsey, a former financial officer at Amdahl, there is a limit to how much of this kind of financing a new company can obtain without giving control away to other stockholders.

control away to other stockholders.

Trilogy was set up in 1981 to develop new semiconductor, packaging and computer-aided design technologies to be incorporated in a large-scale, IBM-compatible computer system. In its prospectus announcing the proposal to offer public stock, Trilogy claimed this technology includes an advanced bipolar semiconductor design and fabrication process, which will result in wafer-scale integrated circuit devices containing approximately 30 times the number of circuits available in current state-of-the-art devices.

"What Trilogy is attempting to do is a radical departure from current technology. When you are embarking on something unknown like this, development costs are difficult to estimate, and it could require anywhere between \$300 million and \$600 million to pull it off," said John Fram, securities analyst at Paine Webber, Mitchell Hutchins in New York.

According to Tom Lerone, Trilogy's vice-president and treasurer, the company will ship its first product sometime in 1985, but he backed away from an earlier prediction that it would be in the first half of that year. Nevertheless, prospective stockholders are taking a risk in putting their money in Trilogy, as the company's prospectus makes clear:

"The computer design is still under development, and significant ad-

Analysis

'What Trilogy is attempting to do is a radical departure from current technology. When you are embarking on something unknown like this . . . it could require anywhere between \$300 million and \$600 million to pull it off.'

John Fram, securities analyst at Paine Webber, Mitchell Hutchins.

vances beyond the current state of the art must be achieved in all prod-

uct development areas to complete the effort successfully. There is substantial risk of schedule delays, and there can be no assurance that the development effort will be successfully completed," it stated.

According to Kelsey, greater than expected development costs and schedule delays are to be anticipated when researching a complex new product. Costs, he explained, are a function of how long it takes to bring a product to market.

"If costs overrun and the product is delayed, Trilogy may need to make additional stock offerings, which could dilute the value of existing shares. This would be the one drawback I could see to investing in the company," Fram added.

Datapoint Profits Show Gain, Mostly From Fourth Quarter

SAN ANTONIO, Texas — Citing strong domestic sales of its office products and computers, Datapoint Corp. has posted year-end profits of just over \$8 million, or 40 cents per share, up from last year's earnings of \$2.4 million. More than half the company's earnings were gained in the fourth quarter, which ended July 31.

Revenues were up 6% to \$540 million for the year, the company reported. Sales in the fourth quarter dipped slightly to \$137.5 million compared with \$140 million the same period a year ago, but profits totaled \$4.3 million compared with

\$3.3 million.

Commenting on the company's performance, Harold O'Kelley, chairman and chief executive officer, said, "Fourth-quarter operations were affected by several nonrecurring events, including the divestiture of the Communications Management Products Division and sale of the company's Denmark subsidiary. . . . We have strengthened our senior management ranks, improved our financial condition, sold the telecommunications operations and tightened our focus on office and computer products."

"If you want to do OEM computer business in the U.S., you'd better go to the Invitational Computer Conferences in Boston, Dallas, Minneapolis, Orange County, Washington, D.C., Los Angeles, Ft. Lauderdale, ...We do!"



LARRY HEMMERICH, V.P. Gen. Mgr. Cipher Data Products, Inc. OEM Marketing Division

Experienced marketing management knows that the best way to reach the technical decision maker/buyer is to meet him where he lives and works, demonstrate operating equipment and provide him with the technical information he needs.

Over the past 12 years successful marketers have found the Invitational Computer Conferences to be the most cost-efficient, effective method of covering their U.S. computer industry customer base.

The exclusive, one-day, OEM conferences will be held in ten major market areas throughout the United States

and are attended by a select, invited audience of OEM's, systems houses and quantity end users. Guests can attend a variety of technical seminars and view operating displays of the newest computer and peripheral equipment. The informal setting makes it easy to

meet with potential customers one-on-one and the simple tabletop displays keep exhibit costs at a minimum.

1983-84 SERIES

Sept. 13, '83	Newton, MA
Sept. 29, '83	Minneapolis, MN
Oct. 18, '83	Valley Forge/Philadelphia, PA
Oct. 20, '83	Washington, D.C./Vienna, VA
Nov. 8, '83	Houston, TX
Nov. 10, '83	Dallas, TX
Jan. 9, '84	Irvine, CA
Feb. 7, '84	Ft. Lauderdale, FL
Feb. 28, '84	Los Angeles, CA
Mar. 1, '84	Palo Alto, CA

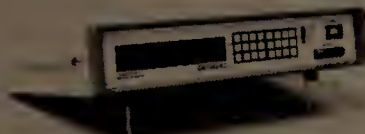
For more information:
B.J. Johnson
& Associates, Inc.
3151 Airway Ave. #C-2
Costa Mesa, CA 92626
(714) 957-0171



RESPONSE TIME MONITORING. PLUS...



YOU'RE MONITORING ON THE WRONG PRIORITY LEVEL!



CPA/7 and Printer



... over 50 other major analysis functions, including multi-level and variable transaction monitoring, line utilization and line load measurements. Our Communication Performance Analyzers also feature raw data dump for data basing, down-line loading and automatic report printing. These monitors allow analysis of such protocols as async, bisync, SDLC/SNA, Honeywell, Univac and others. Models range from single terminal units to multi-line systems. Write or call:

QUESTRONICS, INC.

3565 South West Temple Salt Lake City, Utah 84115 (801) 262-9923 TWX 910-925-4000
IN CANADA CALL: ATELCO (416) 497-2208

Cullinet Shareholders Vote To Change Name at Meeting

BOSTON — Cullinet Software, Inc.'s annual meeting earlier this month could not have been a cheerier gathering.

Chiefs of the self-described "product-rich" software company not only assured a packed auditorium of shareholders and market analysts of brimming coffers, but also got off some well-aimed shots at IBM as well.

In official business that lasted no longer than five minutes, John Cullinane, chairman of the board and chief executive officer, presided over a unanimous shareholder vote to change the company name from Cullinane Data Base Systems, Inc. to Cullinet Software, Inc. Also approved was an increase in the authorized number of common shares from 20 million to 80 million.

Earnings Announced

Cullinet, which became a publicly traded company five years ago, has more than \$44 million in cash and marketable securities and earned \$11.6 million on revenue of \$78.6 million in fiscal 1983.

According to Cullinane, his software company is "product-rich" with \$1.6 million in software products that he claims run the full gamut of available software.

On April 19 of this year, Cullinet announced a three-tiered product which the company claims offers "the full solution" to software needs:

- A relational data base management system called IDMS-Relational, said to combine network and relational architectures in one system.
- A mainframe-based information data base, said to provide access to mainframe data for personal computer users.
- A data base-driven application software system for IBM Personal Computers.

Beta Testing Slated

The product is scheduled to enter beta testing this December and will be available "probably four months after testing," according to Robert Goldman, Cullinet's president.

Calling IBM's recent introduction of Database 2 relational data base management system "modest and far out" and labeling the computer giant "a marketing myopia," Cullinane announced that he could not have been more pleased with the announcement.

"From our perspective, it was a great announcement," he said of the product, which is scheduled for general availability in the third quarter of 1984.

Bank of Boston Announces Pact With Mellon

BOSTON — The Bank of Boston has announced an agreement with the Mellon Bank whereby Mellon would assume the data processing services that Bank of Boston now provides to some 100 correspondent banking customers in the Northeast.

Under the agreement, Bank of Boston correspondents electing to use Mellon's DP services would be converted during the next several months, the bank said. Bank of Boston's decision to discontinue the service followed a strategic analysis of that end of its business.

"The number of banks in the New England region that continue to purchase data processing services from outside sources is declining steadily, due in part to increasing merger and acquisition activity," a Bank of Boston spokesman said. "It is becoming increasingly apparent that to be competitive as a provider of correspondent bank data processing services, one must have significant volumes on a national basis to achieve necessary economies of scale."

Facsimile Mart Will Expand, Study Predicts

SAN JOSE, Calif. — Despite a trend toward integration of facsimile equipment with other information networks, the market for stand-alone dedicated facsimile terminals will continue to grow at an annual rate of 16.4%, reaching \$1.7 billion by 1987, according to an analysis by Creative Strategies International (CSI).

According to "The U.S. Facsimile Market," analog devices that presently comprise 70% of installed units will experience an eroding market and drop to 30% in 1987 as the trend to replace them with less expensive digital terminals gains momentum.

CSI, a subsidiary of Business International Corp., said that facsimile equipment will follow the lead of word processing and data processing toward incorporation into multifunctional information processing systems with communications ability.

Japanese corporations will continue to dominate manufacturing in the industry, but "major American competitors have distribution agreements with Japanese manufacturers, enabling American firms to take advantage of Japanese efficiencies in manufacture," CSI said, adding that OEM arrangements will proliferate.

"IBM may have a major impact on the perception of facsimile as a function in the broader context of data communications," CSI said, citing IBM's entrance into the market with the Scanmaster I nondedicated terminal that also functions as a data output printer and convenience copier.

The report, which includes company profiles and market share data, is available for \$1,450 from Creative Strategies International, Suite 275, 4340 Stevens Creek Blvd., San Jose, Calif. 95129.

Seminar: Getting more control over the manufacturing process.



Seminars on Cullinet's Manufacturing System, and their entire line of software products, will be held in the following cities during the coming weeks.

Baltimore, MD	Oct. 12
Denver, CO	Oct. 11
Detroit, MI	Nov. 3
Edmonton, ALTA	Oct. 13
Harrisburg, PA	Nov. 22
Houston, TX	Sept. 29
Meadowlands, NJ	Nov. 30
Omaha, NE	Sept. 29
Philadelphia, PA	Sept. 28
Phoenix, AZ	Oct. 12
Pittsburgh, PA	Nov. 1
Raleigh, NC	Oct. 13
Regina, SASK	Nov. 15
Salt Lake City, UT	Sept. 27
San Jose, CA	Oct. 18
Seattle, WA	Sept. 29
Tampa, FL	Nov. 29
Tulsa, OK	Oct. 11
Valley Forge, PA	Dec. 1
Vancouver, BC	Nov. 30
Washington, DC	Nov. 22
Winnipeg, MAN	Sept. 28

To reserve a place call Harry Merkin at (617) 329-7700. Or simply complete and return the coupon below.

I'm interested in attending a seminar on Cullinet's Manufacturing System in (city) _____ on (date) _____

Name _____

Title _____

Company _____

Address _____

Phone _____

Operating Environment _____

Cullinet Software works with all IBM 360, 370, 30XX and 43XX computers - or plug compatible equivalent.
Cullinet Software, Inc., Corporate Meetings Department
400 Blue Hill Drive, Westwood, MA 02090 9/26/83 CW

VAX RESOURCE ACCOUNTING SOFTWARE

PACS™ is #1 in VAX™ Resource Accounting, Internal/External Billing and Chargeback, and Performance Monitoring... #1 because it serves more VAX installations than any other resource accounting software package. PACS is the only resource accounting package that has met the rigorous standards for acceptance in DEC's™ exclusive EAS library. In fact, you can even buy PACS directly from DEC, if you wish.

PACS provides much more than standard VAX resource reports. Extra features include flexible billing algorithms, user budgeting, efficient disk storage collection, port speed accounting, software/hardware tracking and an optional login enhancement—EZLOG!™ EZLOG allows users to specify projects during login, making it the only software available with true 3-level reporting by account, project and user. With EZLOG, you can even change projects without logging out.

Source code is provided for both PACS and EZLOG. Plus, STI gives you unprecedented support via toll-free telephone, TWX or mail. Go with the #1 Resource Accounting Software Package... PACS.

Write or call today for details.

Signal Technology, Inc.
5951 Encina Road
Goleta, CA 93117
(805) 683-3771

Outside California, call toll-free (800) 235-5787

VAX and DEC are trademarks of Digital Equipment Corporation

How to control a world you can't always predict.

Cullinet's integrated manufacturing software

Cullinet has a software system that provides manufacturers with the one thing they could use more of: control.

A Cullinet Manufacturing Software System consists of eight applications from Master Production Scheduling to Shop Floor Control. They can be purchased separately or as a completely integrated system.

As a net-change, closed-loop MRP II system, Cullinet's Manufacturing Software provides manufacturing personnel with an accurate reflection of – and easy access to – constantly changing information about the manufacturing cycle. At any point in the cycle.

With this kind of timely information, variables that might influence inventory, resources, personnel, production, distribution, indeed, the very profitability of a manufacturing concern can be accounted for. And, once accounted for, controlled.

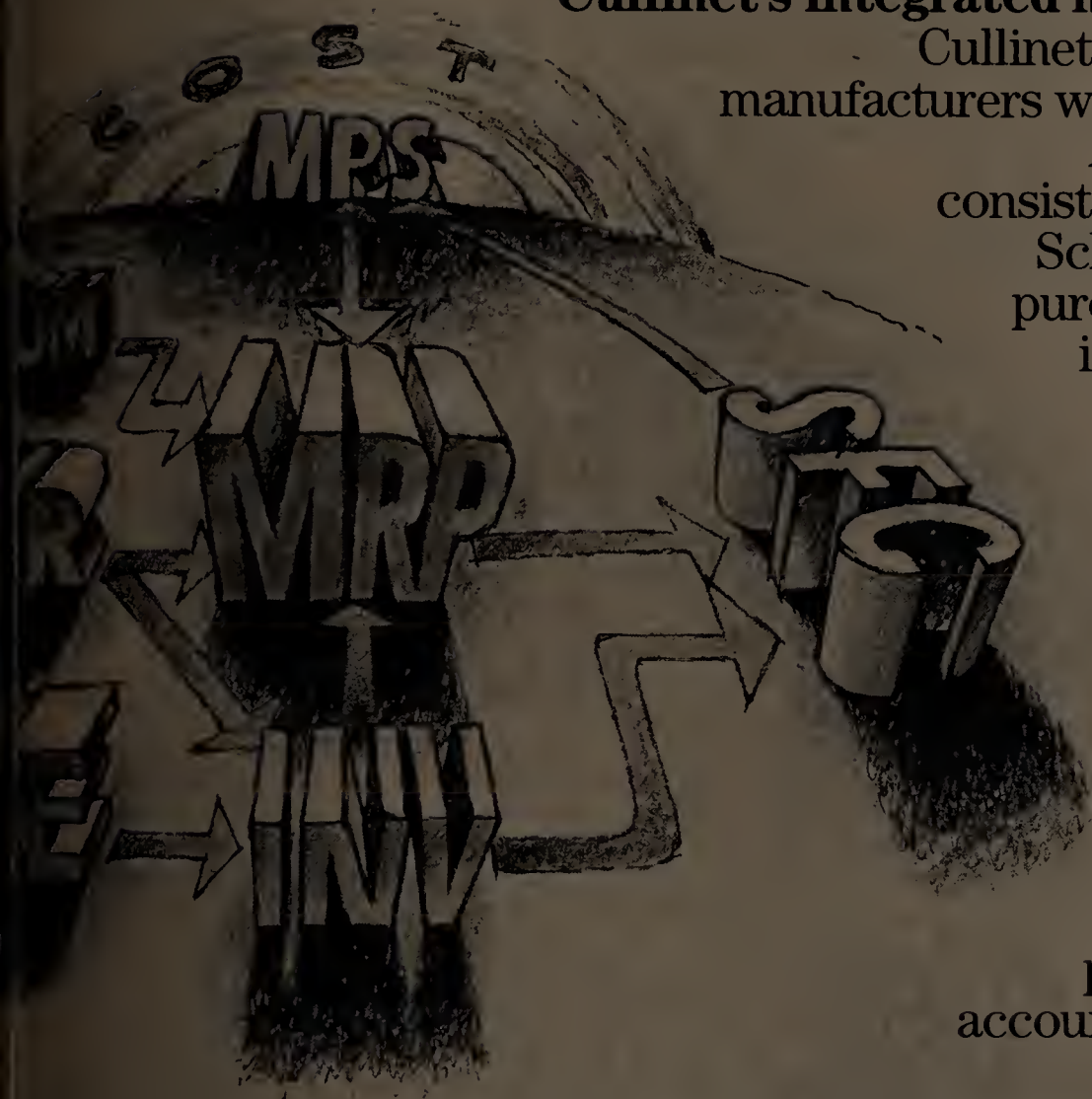
A very flexible system, Cullinet's Manufacturing

Software can bring high-level control to any manufacturing environment however unique or personal your individual style and approach. It can provide single or multi-plant controls. Control for process manufacturing, make-to-order, make-to-stock, or repetitive manufacturing. In other words, it is equally capable in any manufacturing environment.

So even if your world changes in unpredictable ways, we can give you control over it.

Cullinet's Manufacturing Software.

For more information or to attend a seminar on Cullinet's Manufacturing Software, see the page adjacent.



Cullinet

AT&T to Close Another Western Electric Plant

NEW YORK — Continuing to shed chunks of monopoly fat in preparation for court-ordered divestiture, AT&T said this month it will close yet another manufacturing plant operated by Western Electric, AT&T's equipment manufacturing wing.

The company will shut the doors of its 33-year-old Indianapolis facility by early 1986, affecting some 3,700 people currently working there. A Western Electric spokesman said some of the workers will be laid off, some transferred and others retired. The Indianapolis plant produces telephones and communications components, primarily.

The recent announcement is the fourth such facility phaseout hatched

since the beginning of the year. Plants at Kearny, N.J., Cicero, Ill., and Baltimore will also be shut, affecting about 10% or 14,200 of Western Electric's work force of 132,000.

Further, more announcements of partial or total closings are expected before the year's end, as AT&T completes a plant consolidation program. At present almost 40% of the plant capacity at Western Electric's 21 facilities is idle, the spokesman said.

The closings mirror the impact of Western Electric's imminent loss of the Bell operating companies as a captive market once divestiture takes place. Most of the operations curtailed by the announced plant closings involve the manufacture of customer premises equipment, such as

telephones, which next year the operating companies will be free to purchase from any vendor.

Western Electric has also taken a pounding in the domestic private branch exchange (PBX) market. Its

market share of the large-scale PBX market, for example, fell from 60% in 1980 to 29% two years later, according to Northern Business Information, a New York-based research firm.

Honeywell Inks Agreement With Drexler for Laser Cards

MOUNTAIN VIEW, Calif. — Honeywell, Inc. has signed a licensing agreement with Drexler Technology Corp. for laser card equipment, whereby Drexler grants worldwide rights to patents, technology and the designs to four proto-

type devices for using Drexon laser memory cards.

The cards, which optically store up to 16M bytes of data on a medium the size of a credit card, compete against floppy disks and semiconductor storage devices on the basis of capacity and price per unit of storage. Formatted Drexon cards for laser recording up to 2M bytes are priced at \$1.50 each when purchased in volume, Drexler said.

The cards are designed for a range of applications, including office automation, data distribution, banking and sales transactions, medical records and personal computer software loading and distribution.

Honeywell becomes the tenth vendor to license Drexler's laser card equipment, joining NCR Corp.; Wang Laboratories, Inc.; Ericsson Information Systems; and several Japanese companies.

Plexus Signs \$40 Million Pact With Philips

SANTA CLARA, Calif. — Plexus Computers, Inc. has signed a three-year, \$40 million pact with Philips Information Systems, Inc. for the delivery of 32-bit supermicrocomputers.

Under the agreement, Philips will purchase the Plexus P/35 system, a 32-bit tabletop microcomputer, and the P/60, said to support up to 40 users and based on Plexus' proprietary multiprocessor architecture.

The contract also covers future supermicrocomputer systems under development by Plexus, as well as board-level products, the firm said.

Philips will purchase the systems for use as shared resource and network processors in its future office automation products, a spokesman said. The company's European operations may also purchase Plexus equipment for use in turnkey vertical market systems.

Facing Losses, Victor Trims Staff by 500

SCOTTS VALLEY, Calif. — For the third time in two months, Victor Technologies, Inc. is paring its work force, this time by some 500 employees, in the face of heavy losses.

The layoff will reduce Victor's work force to 1,500, less than half the number employed in August. Victor has also instituted a series of consolidation moves designed in large part to control costs.

Victor lost \$11 million in the second quarter, soon after the personal computer maker went public.

Nobody puts it all together like Zytron.



Our micrographic products are basic to better information systems.

As an industry leader, we've got the expertise and the technical know-how to help you analyze and choose the right micrographic products and services to meet your office information needs.

You get quality products—ranging from microfilm readers and reader-printers, chemistry and film, to

office microfilming and CAR systems—that are pre-tested for reliability and durability.

Plus, Zytron gives you complete service support in purchase and installation. Product availability and on-time delivery are insured through Zytron's national distribution operation—featuring automated order entry, inventory and tracking systems—linking its network of Servicenters across the country.

And, Zytron offers you the option of buying or leasing many of the products you need.

So, you can count on Zytron for cost efficiency and performance. For full-service, and a *full-systems approach* to office information management, turn to Zytron.

Zytron. The intelligent answer.

Zytron

DB a company of
The Dun & Bradstreet Corporation

Executive Office
2200 Sand Hill Road
Menlo Park, California 94025
(415) 854-2306

Call for the Zytron Servicenter nearest you.

Softcon Trade Fair Slated For Feb. 21 in New Orleans

NEW ORLEANS — Softcon, an international conference and trade fair for the software industry, will be held here at the Louisiana Superdome Feb. 21-23. It will feature approximately 800 booths and more than 100 seminars, panel discussions, conferences and workshops.

The conference is aimed at retailers, wholesalers, independent sales organizations,

consultants, Fortune 1,300 buyers, government agencies, volume buyers, educational institutions, software professionals and software developers.

Registration is \$30 for an exhibits-only badge and \$195 for the full conference. Further information is available from Northeast Exposition, 822 Boylston St., Chestnut Hill, Mass. 01267.

Software Testing Service Offered

BEVERLY, Mass. — Duncan Associates has announced the availability of Contract/QA, a software testing service said to provide software developers with a cost-effective approach to delivery of high-quality application software.

The service is reportedly based on a standardized approach to quality assurance and includes both software testing and an assessment of user and technical documen-

tation. Software testing procedures include pretest definition of expected results, full edit testing, case testing and written documentation

of all bugs found, the company said.

Further information is available from 108 Lothrop St., Beverly, Mass. 01915.

Executive Corner

• **John MacDonald** has been appointed president of Northern Telecom Finance Corp., a subsidiary of Northern Telecom, Inc.

• **Howard A. Thrailkill** has been named president of Four-Phase Systems, Inc. and appointed vice-president of Motorola, Inc.'s Information Systems Group.

• **H. Glen Haney** has been named president and chief executive officer of Micropro International Corp., and **Seymour I. Rubenstein** has been appointed chairman of the board of directors.

• **Barry N. Yarkoni** has been appointed vice-president of marketing, and **Michael A. Lento** has been named vice-president of operations at Business and Professional Software, Inc.

• **Anthony L. Craig** has been appointed vice-president, international sales integration, at General Electric Information Services Co.

• **William J. Gunter** has been elected vice-president and treasurer of United Telecommunications, Inc.

• **Felix J. E. Rosengarten** has been elected a vice-president of American Microsystems, Inc. and named general manager of Asahi Microsystems, Inc., which is American Microsystem's joint venture in Japan.

• **Gerald D. Knudson** has been appointed vice-president of sales at Calma Co.

• **James R. Oyler** has been appointed vice-president and general manager of Harris Corp.'s Computer Systems Division, replacing Howard A. Thrailkill, who has left Harris to join Four-Phase Systems, Inc.

A PICTURE'S WORTH:

\$1895.

**I want a
FREE TRIAL
of the
concept
terminal
in my office**

- ☐ ...and I want it now. Please call.
☐ Send more information on the concept GVT.

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Telephone _____

Human Designed Systems, Inc.
3440 Market Street, Philadelphia, PA 19104

Human Designed Systems, Inc. is a leading provider of computer graphics and applications development services. We are currently seeking qualified individuals for the following positions:

Graphic Artist — Must have 3+ years experience in computer graphics. Call 215-381-5000 or your local HDS office for a consultation and free, no-obligation, trial in your office.

Software Developer — Must have 3+ years experience in software development. Call 215-381-5000 or your local HDS office for a consultation and free, no-obligation, trial in your office.

Systems Administrator — Must have 3+ years experience in systems administration. Call 215-381-5000 or your local HDS office for a consultation and free, no-obligation, trial in your office.

Human Designed Systems, Inc.
3440 Market Street, Philadelphia, PA 19104

Beyond Incremental Improvements

MCC Finalizes Plans for \$350 Million in R&D

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — Microelectronics and Computer Technology Corp. (MCC), the 13-firm joint research and development venture pioneered by Control Data Corp. Chairman William Norris, has finalized plans for almost \$350 million in initial R&D, according to the organization's technical director.

Thomas F. Gannon, on loan to MCC from Digital Equipment Corp., where he is technical director of DEC's Technology Development Program, told the Federal Computer Conference here recently that like other advanced R&D projects around

the world, MCC's work is "not targeted for incrementally improving current technology."

Instead, MCC's four initial projects, involving very large-scale integration (VLSI), software technology and systems architectures, are aimed at producing major breakthroughs in the development of specific systems for selected applications.

This approach, he noted, is "a drastic change" from the historic trend of concentrating on orderly advancement of general-purpose computing.

He pointed out that Japan, France and the UK are all developing projects aimed at accelerating the rate of

technology development to leapfrog current industrial trends. Their actions have been countered in the U.S. by projects under the auspices of the Defense Department's Advanced Research Projects Agency, the Energy Department and the National Science Foundation, as well as by the joint venture Semiconductor Research Corp.

MCC, currently establishing headquarters in Austin, Texas, is gearing up its four R&D projects, Gannon said.

The first, called "Alpha-Omega," is aimed at developing advanced computer systems architectures to support knowledge-based expert sys-

tems used in data base modules, human interface systems and parallel computations with performance levels exceeding current levels by several orders of magnitude, he said. The project will run for 10 years at \$15 million a year with 85 professional and support personnel involved.

The software technology project, he said, is designed to "increase the productivity of the overall software development process for both software and nonsoftware professionals."

Access to computers in the 1990 time frame will be so widespread, according to Gannon, that software will have to be developed that can be used by anybody, particularly those who are unable to write even a single line of code.

He pointed to ViciCorp's Visicalc and similar software packages as precursors of this type of development. The MCC project will last for eight years, cost \$8 million a year and have 60 staffers, he added.

The third program, VLSI computer-aided design and computer-aided manufacturing, will last eight years, be financed at \$11 million a year and require 80 staffers, according to Gannon.

He said MCC hopes to develop a system to allow design of chips with one to 10 million transistors in less than one month's time. Currently, that task would take from 18 months to two years to complete, Gannon maintained.

The final project, the VLSI systems packaging and interconnection program, will try to develop advanced system packaging methods for chips with 700 I/O connections, each with power dissipation of 10W per sq in. Gannon said current technology is about 100 pins per sq in. and less than 1W per sq in. The MCC project will run for six years at \$7 million a year and will involve 35 professional and support personnel.

James Martin's latest book is out

The tall gangling figure of computing writer-lecturer James Martin is to commercial data processing what J R Ewing is to the rest of Dallas: a goad (and one reputed to have a JR sized income).

And sometimes he reads like Dallas sounds. Though English, his books are written in business-technology Americana (he has spent around 20 years there, most of them with IBM). It may sometimes be an ugly staccato language, but at least it is usually clear, and as his knowledge of computer technology and operations is encyclopaedic, his books have sold well into seven figures.

The result is that the lectures he gives on his world-wide circuit are usually packed. He tells with amusement of the one day lecture he gave in Australia where the audience was so large that they had to use the Sydney Opera House.

All this means that in conventional computing circles, a new work from Martin is an eagerly awaited event - and not least by some Japanese and Taiwanese publishers who like to produce pirate editions.

An *Information Systems Manifesto** is not so much a book as a well structured and sustained onslaught (It is entitled "A Report". You can charge more for reports than for books).

The onslaught is on the (claimed) crisis in DP operations, which comes from the widespread use of obsolete methodologies and techniques to generate systems which will then run on the latest hardware, systems which then do not do what management expects if, by the time they are up and running, management has not forgotten what it originally asked for and expected.

His contention is that the crisis is caused by user inability to get what they want up and running when they want it. In most well managed corporations the demand for new applications is rising faster than DP can supply them.

The imbalance between demand and supply is becoming worse, and applications backlogs are growing. Two to four years is the norm, though he quotes one American bank executive as saying that the bank's backlog was seven years.

But this is the documented backlog and only reveals part of the story. There is also an invisible backlog as users, knowing they are not going to have their applications up in any reasonable time scale, cease to demand them.

And that invisible backlog is often larger than the one that has been documented. Thus a recent US study sought to measure the invisible backlog in

Now for the next 10 years



Martin: how to get rich

typical Fortune 500 corporations, and concluded that among those studied it averaged 168 per cent. If the bank was one of them, it would put its true backlog at 19 years.

The backlog is not simply about more of the same. Applications break down into four groups. There are the routine monitoring standard-report applications, the backbone of traditional DP; exception reporting about predefined exception conditions; enquiry systems which enable users to change reports as and when they wish; and analysis systems to support decision making.

If one is to consider them in terms of what commercial DP installations do, we find that there are more of the first than the second, more of the second than of the third, and more of the third than of the fourth, with probably a difference between one and four of - at least - one order of magnitude.

But what do managements want? Same study: six times as many analysis systems (group four), three times as many enquiry (group three) and twice as many exception (group two) systems as are currently being installed.

How are these to be obtained? Martin's case is that they are not going to happen by relying on a centralized DP applications programming department, hand programming methods, standard languages such as COBOL, and standard methodologies - or the lack of them, the very methods which

are leading to the ever increasing backlog.

Structured programming may help, but not enough. The real route lies in the use of techniques about which most non DP managements are not yet aware. As he puts it in his half page summary "Manifesto for Senior Management".

"Understand that a revolution is taking place in DP, but that many DP departments are not moving fast enough to the higher productivity techniques."

He is not talking about flooding the organization with micros. Among the techniques and methodologies he describes and discusses are programmerless applications-programming languages which with their near plain language characteristics can make it easy for users to write their own applications, and the information centre concept, a tool of managerial control.

Then there are techniques for data management, for much corporate data is often not as well organized as it could be. You can ask the question, but you cannot get the answer. And of course prototyping, trying it out before you build the entire software system.

Martin's last section deals with the technology of the next ten years. It is very different. Its preoccupation is with how to get rich.

He writes about those who have already become rich from computing related technologies getting together and discussing those who have also "made it" in terms made popular by the film *10*, except that the numbers, exponents of ten, deal with wealth.

"There are many thousand 6's, several hundred 7's, a healthy handful of 8's, and at least one 9."

The best information available is that Martin is among the sevens. So how can one join him and them? He gives a long list of likely or necessary changes in the technology and its application, almost a list of opportunities to make money, even if of course here in polite society it should be referred to as "generating wealth".

Martin's last non specialist book *The Wired Nation* was on the famous list of books that Sir Keith Joseph recommended senior civil servants should read. (The *New Statesman* in one of my favourite misprints called it "The Wild Nation").

I do not know whether Sir Keith will like this one, but Mrs Thatcher certainly would. On the more normal scale of 10, I suspect she would probably give it an eight or a nine.

Rex Malik

Reproduced by permission of
The Times Newspapers Ltd,
London, England, May 10th 1983

Martin's latest Report rated big space in The Times of London!

ISN'T IT TIME YOU GOT YOUR COPY?

When you read what The Times had to say about Martin's latest 'onslaught' entitled "An Information Systems Manifesto", you will agree that it's a 'must'. Published by Savant Institute, the report is one of a continuing series of vital interest to all concerned with the changing technological communications environment.

ORDER NOW

savant

1901 Avenue of the Stars, Suite 980,
Los Angeles CA 90067, Tel. (213) 277 0355

Please send ☐ copies of "An Information Systems Manifesto" @ \$105 incl. P. & P.

and/or ☐ copies of savant's list of Technical reports and forthcoming seminars. ☐ Check enclosed. ☐ Please send invoice.

Name

Title

Organisation

Address

City

State

Zip

Signature

Nickels & Dimes

Safeguard Business Systems, Inc. has reported net sales for the first six months of 1983 of \$78 million and net earnings of \$4.9 million, increases of 15% and 27%, respectively, over the same period a year ago.

\$\$\$

Pansophic Systems, Inc. has reported revenues for the first quarter ended July 31, 1983 of \$10.6 million, up 24% from the same period a year ago. Income before taxes rose 28% to \$1.7 million, and earnings per share rose from 9 cents to 12 cents for the quarter.

\$\$\$

M/A-Com, Inc. has reported income for the third quarter ended July 2 of \$8.3 million or 20 cents per share, down from \$10.3 million or 26 cents per share, for the third quarter last year.

Qantel Retrial Denied, CSE Award Confirmed

BOSTON — A U.S. District Court judge has denied a request for a retrial, ordering Qantel Corp. to pay \$4.9 million in damages and legal fees to Computer Systems

IRD Study Examines Finance Mart

NORWALK, Conn. — The \$1.3 billion market for on-line financial information is undergoing a "drastic transformation," where "the technologies designed to serve a market might end up making that market nonexistent," according to Ken Bosomworth, president of International Resources Development, Inc. (IRD).

A recent IRD study, "Financial Information Services — On-Line Teledelivery," points to both the personal computer and the management workstation as the primary catalysts leading to widespread changes in the financial information services market.

One reason why microcomputers are displacing terminals is that they are already on many users' desks. The report estimates that in the financial community alone, there are 200,000 to 300,000 micros in use. Moreover, micros are general production models, meaning that information vendors can get their hands on them whenever and in whatever quantity they are needed, avoiding the backlog and inventory snafus that have too often plagued them in a custom terminal environment, the report said.

But the main reason that microcomputers have the edge is simply that they can do so much more than terminals, the study continued. Although the report found micros to be a "great improvement over the terminal," it said that the "next generation" terminal on the horizon, the executive workstation, will be to the microcomputer what the microcomputer was to the terminal.

Further, IRD predicted Apple Computer, Inc.'s Lisa, which it terms the first executive workstation, will come to be viewed as rudimentary compared with other executive workstations that will enter the market over the next five years.

These workstations will have voice recognition and synthesis capabilities and will incorporate knowledge-based systems.

The report costs \$1,285 from IRD, located at 30 High St., Norwalk, Conn. 06851.

Engineering, Inc. (CSE), a Burlington, Mass.-based systems distributor.

In issuing the Aug. 30 memorandum and order, Judge Robert Keeton reaffirmed a July 8 opinion granting CSE double damages totaling more than \$2.3 million, plus an additional \$267,000 in legal fees. In the recent court document, Keeton made what he termed additional findings of fact "in

support of my award of double damages." That July opinion also set aside a \$15 million punitive damage award against Qantel and its parent company, Mohawk Data Sciences Corp.

The award and denial of Qantel's motion for a retrial harken back to an agreement between the two companies in 1976, when CSE began distributing Qantel's mini-computer line with the Solu-

tions software package.

Keeton's strongly worded memorandum lashed out at Qantel for its alleged "reckless disregard for the truth in making false representations to CSE to induce CSE to enter into the distributorship agreement..."

CSE, Keeton said, attempted to improve Solutions for end users, but "was hampered by lack of explanatory documentation necessary for

independent modification."

Qantel has until the end of the September to respond to the memorandum and order. The company's local counsel, Thomas Dignan, declined to discuss whether Qantel would appeal, and a spokesman for the company could not be reached at press time. CSE's counsel, Thomas Christo of North Hampton, N.H., could not be reached for comment.

A TESTIMONIAL FOR THE BURROUGHS B20 FROM SOMEONE WHO SPENT 17 YEARS AT IBM.



Dr. W. LEE SHEVEL
Senior Vice President, Corporate Operations, Burroughs Corporation

Some people think that because IBM is bigger than Burroughs, they're better than Burroughs. After working for many years at IBM, I can tell you that bigger doesn't necessarily mean better.

Take small business computers: the Burroughs B20 and IBM's Datamaster.

The B20 Series can offer up to five times more memory capacity, can store twice as much data, can have more workstations, offer more kinds of printers, and has a 25% bigger screen (to display more data at once).

With its powerful 16-bit processor and up to 640K bytes of RAM in each workstation, the Burroughs B20 gives each user his own computer, but with the power, memory and data base that was once associated only with mainframes.

More importantly, the B20 can be networked with other B20's (while sharing the same data base, printer, or mainframe communications), so everyone is always working with the latest, up-to-date information.

And because the B20 supports all four industry-standard languages (COBOL, FORTRAN, Pascal and BASIC), users can select the language best suited to their individual needs. With IBM's Datamaster you have one choice—BASIC.

With IBM's Datamaster you have one choice—BASIC.

In operating systems, the B20 will soon give you a choice of CP/M® or MS-DOS.™ Or you can choose BTOS, our own operating system, which has more features.

To operate the B20, all you do is open the carton, plug it in,* choose one of our many business software programs (payroll, accounts receivable, inventory control, etc.), and you're in business. (Our step-by-step training manuals are so easy to use, you can be doing sales projections, accounting tasks, or scheduling in a matter of hours.)

If there are any questions, just call the Burroughs hot line. Trained Burroughs computer specialists will help with any problem that arises. (90% of all questions are answered in the first call.) We also have service depots in 19 cities throughout the U.S., or you can choose on-site servicing.

So, when it comes to choosing between IBM and Burroughs, take it from someone who knows both.

The questions isn't who's bigger. It's who's better.

Burroughs

THE QUESTION ISN'T WHO'S BIGGER.
IT'S WHO'S BETTER.

*B22 mass storage unit requires installation by a qualified Burroughs service representative.
CP/M is a registered trademark of Digital Research, Inc.
MS-DOS is a trademark of Microsoft Corporation.
For more information call 1-800-621-2020 or mail coupon below.

I'm interested in the Burroughs B20 small business computer.
Please send me more information.

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Telephone _____

Send to: Burroughs Corporation
Dept. B20, Box 10934, Chicago, IL 60610
© 1983 Burroughs Corporation CW-926

POSITION ANNOUNCEMENTS

Imagination, like information, is infinite.

There is no finite limit to the amount of information available to mankind. Unlike other resources, our storehouse of data gets bigger and bigger every day.

A job for a unique company. With a penchant for problem-solving. And limitless imagination. A job for Xerox.

At Xerox, we've dedicated ourselves to the development of an architecture that will give information new order and discipline...Through a relentless search for solutions, we are creating incredible advancements in electronics information systems. Systems that interact, that offer new possibilities for the evolving office environment. Our customers include both the Federal Government and commercial users. What kind of contributions can you make? The opportunity is infinite.

Senior Systems Engineer (Communications Specialist)

Will be responsible for the design and integration of digital systems to meet special application requirements. Will interface special devices and CPU's to local area networks for I/O or data storage and retrieval. Requires 10 or more years experience in similar systems work and in-depth knowledge of digital communication hardware and software. MSEE or Computer Science required, or equivalent. PhD, EE or Computer Science preferred.

Systems Software Programmers

Will specify, design and develop special systems and application software. Position will include specification, design, implementation and testing of workstation and local area network software. Knowledge of Pascal helpful. MS in Computer Science or EE/Computer Science or equivalent and 7 years experience required.

Systems Software Specialists (Digital Systems)

Will design and integrate digital systems to meet special application requirements. Will work with user groups to define systems requirements and specify appropriate systems, implement and test. Requires 8 years experience in similar work. MS in EE or EE/Computer Science or equivalent preferred. Ability to work with customers essential.

Systems Software Specialist (Local Area Network)

Will be responsible for the specification, design and development of special systems and application software. Candidate must be able to participate in systems specification, lead design of appropriate software and guide implementation and testing. Knowledge of local area network software and Pascal helpful. Experience in software estimation and scheduling important. Good documentation skills essential. MSEE or Computer Science or equivalent is necessary. PhD in EE or Computer Science preferred with 8 years experience in similar systems work.

Systems Programmers

As a key member of our staff, you will be required to develop, code, debug and document complex computer programs involving minicomputers and their operating systems and special electronic interfaces. Qualified applicants must meet the following criteria: **Hardware experience:** minicomputers (DEC, DG, etc.). **Languages:** Assembler, Pascal and C. **Operating Systems:** RDOs, RTOS, AOS. **Degree:** BSEE/CS or equivalent.

Senior Systems Engineer (Digital Systems)

Will design and integrate digital systems to meet special application requirements. Will work with user groups to define system requirements, create system specifications and implement specification in hardware and software and test resulting systems. 10 years experience in similar work is required; MS or equivalent is mandatory, PhD preferred in EE or EE/Computer Science. The ability to work with customers is essential.

We offer competitive salaries and benefits plus an outstanding profit sharing plan. Join the high visibility people at Xerox, forward your resume NOW to Professional Staffing (indicating position of preference), or call COLLECT (213) 351-2351. Xerox Special Information Systems, 250 N. Halstead St., P.O. Box 7018, Pasadena, CA 91109. (Applicants only, please.) Xerox is an affirmative action employer. U.S. citizenship is required for all positions.

XEROX

DATA PROCESSING PROFESSIONALS

DATA RESOURCE CORPORATION, headquartered in Atlanta is a leader in quality Contract Programming and Consulting. Our continued growth in the Southeast and Southwest has created opportunities for versatile Professionals with state-of-the-art skills in Programming and Systems Design.

We are currently seeking individuals with at least 3 years of diversified programming experience, strong technical backgrounds and who possess the desire to work in various stimulating Data Processing environments. IMS and CICS skills are of special interest, as are the abilities to travel or relocate.

We can offer you competitive salaries and comprehensive benefits programs, including bonuses and profit sharing. If you've been searching for a growth opportunity with a dynamic and progressive company with a Management team that puts people first, then DRC is your answer.

For immediate consideration, please call BECKY FINLEY at 1-800-241-6002, or send your resume to:

DRC

DATA
RESOURCE
CORPORATION

3301 Buckeye Rd
Suite 103
Atlanta, GA 30341
(404) 455-7260

An EOE M/F

PROGRAMMER

UNIVERSITY
OF CALIFORNIA
BERKELEY

Programmer needed to support ongoing hardware development, testing and calibration tasks, with emphasis placed on providing documentation to support software currently being developed. Tasks will be done using Fortran, MATHC/L and Assembly languages on a network of workstations running UNIX. Salary range: \$23.6K-\$28.5K.

Benefits include medical and dental, 3 weeks annual paid vacation, and excellent retirement.

DEADLINE
SEPTEMBER 30, 1983

For information, call Carl Dobson:
(415) 642-7318

To apply, send resume to: Personnel Office, Box 08-434-44, 2539 Channing Way, U.C. Berkeley, Berkeley, CA 94720. The University of California is an Equal Opportunity, Affirmative Action Employer.

ROMAC

Romac & Associates/Personnel Consultants (Agency) specializes in the placement of Data Processing, Accounting, Banking and Financial Personnel. All Fees are paid by our client companies. Below are representative opportunities. Qualified candidates are invited to call or write for appointment. NO RESUME NEEDED. Replies held in confidence.

SYSTEMS MANAGER

\$42,000

1221 MARINE MIDLAND PLAZA
ROCHESTER, NEW YORK 14604
716-232-4610

Arizona/California/Texas/Colorado/Florida/Boston SCIENTIFIC OR BUSINESS PROGRAMMERS

All fees and relocation paid. \$20-40,000

If you have a BSEE, BSCS, BS in Mathematics or Physics or equivalent, we need you right now.

For Business: OS/DOS/IMS/CICS/MVS/JES Prog/Anal/Systems/Data Base. All large scale installations.

For Scientific: experience in the computer, communications, semiconductor, or aerospace/defense industries.

Your name, resume, and present employer will not be given out without your permission.

For sincere personal service, please send a confidential resume to:

Dan Pullman (602) 274-5660
PULLMAN PERSONNEL

3033 North Central Ave. Suite 401, Phoenix, Arizona 85012

SOFTWARE ENGINEERS SUNBELT TO 70K

UNIX, C, PASCAL, DEC, REALTIME, INTEL, VAX, RSX-11, SCADA, SNA/SDLC, X.25. To explore sunbelt opportunities in software design in the above environment call or send resume to:

FOX-morris

BOB GOLLIAN - 1350 Johnston Bldg. Charlotte, NC 28281 - (704) 375-0600
KYLE PURDY - Regency Center 2 - Suite 601 5501 LBJ Freeway - Dallas TX 75240 (214) 934-2350
MIKE HUNTER - 3101 Poplarwood Court Raleigh, NC 27625 - (919) 872-2940
JEFF JENNINGS - 47 Perimeter Ctr East, NE Atlanta, GA 30346 - (404) 393-0933

PROGRAMMER ANALYST

Lorex Pharmaceuticals, a newly established expanding company with extensive clinical research activities, has immediate opening for a Programmer Analyst. Qualified person will have experience in IMAGE Database, QUERY, and FORTRAN on HP 3000, and will be responsible for overall computer operation. We offer competitive salary, excellent benefits and relocation program, and professional international working environment. For confidential consideration, please send your resume to:

Mr. R. Huck, Director of Operations
LOREX PHARMACEUTICALS
5200 Old Orchard Road
Skokie, Illinois 60077

position announcements

position announcements

position announcements

position announcements

position announcements

Engineering

Staff Customer Engineer

If you're searching for a career that gets you out from behind a desk — consider this position with Hewlett-Packard.

We have openings in customer engineering for a person with excellent communications skills, a fundamental understanding of computer troubleshooting and a BSET, BSEE or equivalent. As a customer engineer, you'll install, maintain and troubleshoot our computers and peripherals at customer locations throughout the San Francisco area.

You'll undergo an eighteen-month training program at Hewlett-Packard that will familiarize you with HP's computer product lines. Then you'll be responsible for maximizing the productive use of our customers' HP installations through hands-on problem solving.

Your experience, education and HP-training will help you begin a career limited only by your own ambitions and skills. If you are interested in a truly challenging career with a company known for its innovative and exciting products, please send your resume, in confidence, to Hewlett-Packard Company, Neely Sales Region, 3003 Scott Boulevard, Santa Clara, CA 95050. Attention: Professional Employment, Box 4005. We are an equal opportunity/affirmative action employer.

Where performance is measured by results



SENIOR SYSTEMS PROGRAMMERS

In Phoenix, Arizona

Our card operations center located in Phoenix, Arizona with a state-of-the-art computer environment, is seeking individuals with a minimum of two years experience as a Systems Programmer in an IBM environment.

Openings require expertise in one or more of the following areas:

- ACP
- IMS DB/DC
- MVS
- ACF/VTAM/NCP
- VM

American Express is interested in discussing employment opportunities which involve responsibility for system software generation, installation, maintenance, enhancements and problem resolution.

State-of-the-art computer environment includes:

Hardware: IBM 3081 (3), 3033 (2) and 3032 (2).

Software: MVS/XA, TSO, PARS/ACP, IMS DB/DC, IBM Data Dictionary, MSC, NCP, VM.

Qualified applicants may call (602) 954-1733 for further information or send a resume and salary history.



American Express
P.O. Box 13781
Phoenix, Arizona 85002

An Equal Opportunity Employer M/F

SOME PEOPLE SEE.



OTHERS HAVE VISION.

Harris Government Systems Sector is involved in many of the most stimulating and ultimately rewarding technological challenges available. All of our on-going projects depend on strategic software advances in: Real-Time, Scientific/Analytic Applications, Operating Systems, Simulation and Modeling, Telemetry Processing, Mission Operations, Interactive Graphics, Communications, Large and Secure Data Base, Man-Machine Interface Design and full Systems Architecture capabilities.

The Government Information Systems Division is responsible for pursuing major programs in the software marketplace. Our GISD Software Operation provides Software-Intensive programs, services, and systems products to government customers. We are involved in all aspects of the software life cycle from concept definition design & development, all the way through implementation and field support. We use the latest tools and techniques. Qualified candidates will be attracted by the unparalleled growth opportunities in our project-team environment, backed by a dynamic Fortune 200 Parent Company with 1983 sales in excess of \$1.4 billion.

DISPLAY/IMAGE PROCESSING ENGINEERS:

Must have 3 years minimum experience in Image Processing and graphics software development using **RAMTEK 9460 Image Processor**. Experience with VAX 11/780 or 750 with VMS Operating System using FORTRAN 77, especially for satellite image processing application.

SOFTWARE DESIGN ENGINEERS:

You should have a BS in CS, Math, EE or a related Technical discipline as well as experience with DEX VAX, Data General or Tandem Systems and any of these languages: FORTRAN 77, PASCAL, PL/1, ADA, DEC MACRO Assembly. Experience desired in several of the following areas: Real-Time Database Systems, Advanced Software Methodologies, Modeling and Simulation, Image Processing for Displays, Network Protocol Software, Real-Time Scientific Software Development and Software Documentation.

HARDWARE/SOFTWARE SYSTEMS ENGINEERS:

Requires a BS in EE, CS or related field, MS or PhD desired, and at least 5 years experience in any of the following: image processing; information processing; meteorological systems; SIGINT systems; information handling & routing; storage, retrieval and display; high-speed local area network; tactical and strategic systems; artificial intelligence; analysis, simulation and modeling; minicomputer and micro-processor distributed processing systems; computer and software architecture; photogrammetry; cartography.

SOFTWARE SYSTEMS TEST ENGINEERS:

BS degree and 3+ years experience with performance of detailed software module testing; writing software test plans to government format, developing software programs for integration and test activities.

U.S. Citizenship is required for all positions.

Take a panoramic view of Melbourne:

An Atlantic oceanside setting, complete with white sand beaches, waving sea oats, and miles of waterways, inlets and rivers.

A playground for sports enthusiasts with everything from sailing and snorkeling to golf and tennis.

A youthful but sophisticated approach to city living that includes superb dining and entertainment, cultural events, fashionable shopping, affordable housing, along with close proximity to your job as well as major tourist attractions and NO STATE INCOME TAXES.

A hub of activity in the electronics industry that attracts hi-tech experts and their families from around the world to create a city unlike any other.

This completes the picture:

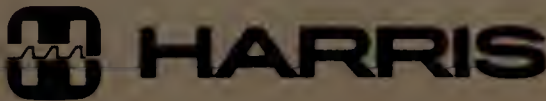
We are a part of Harris Corporation, Florida's largest industrial employer. We offer a formal merit review program and outstanding advancement opportunities. We are a close-knit team of professionals sharing our experience and insights, in an open, communicative and unregimented environment. We offer an excellent compensation and benefits package.

We will be conducting interviews this fall in the following cities:

- Palo Alto
- Philadelphia
- St. College, PA
- Boston
- Denver
- Washington D.C.
- Phoenix
- San Antonio

For more information please call our toll-free number 1-800-327-8552 anytime 7 days a week. Or send your resume in confidence to: H.J. Ostis, Personnel Manager, Harris GISD, P.O. Box 98000, Dept. CW926, Melbourne, Florida 32902. We are an equal opportunity employer, m/f/h/v.

We'd like to share our vision of the future with you.



We're Growing So Fast We Can't Wait For You To Update Your Resume.

At Computervision we're charting a course for the future. We're working on technologies that will carry the momentum of Computer-Aided Design, Manufacturing and Engineering into new, untapped industrial and commercial applications. Opening up new markets for our industry-leading products. Propelling us into a new era of unprecedented growth and prosperity.

To reach our goals, we're going to need a lot more great people. We've got plenty of good reasons why you should be one of them. And we've prepared this cover letter so you can find out about opportunities at Computervision without having to waste even one day updating your resume. Just complete our letter, attach your resume, mail it to the appropriate address, and we'll tell you how our plans can fit into your future.

Sept. 26, 1983

Dear Computervision:

I'm as excited about your growth plans as you are. Computervision is the kind of company where I can keep my career moving — rapidly and in the right direction. That's why I'm interested in your opportunity for a _____.

I am presently a _____.

I have _____ years' experience with _____.

A few of my accomplishments include:

• _____

• _____

• _____

• _____

My salary expectation is _____.

() _____ day () _____ Please call me at _____ evening.

Thank you very much for your time and consideration. I look forward to hearing from you soon.

Sincerely,

Address: _____

Communications/Networking

Systems Project Leader

We are currently seeking an experienced software development professional to lead a team chartered to design and implement multiple communication links between systems. You will need at least 5 years in-depth experience in linkage of mainframes, including knowledge of IBM systems (VM/CMS, OS, channel) and the ability to develop and architect communications products. A BSCS or equivalent, prior experience as a technical project leader, and good communications skills are essential.

Networking Project Leader

Leadership opportunity for experienced project leader with a broad communications and networking background including direct development experience on networking products (eg, DECNET, SNA, PRIMENET, etc.). Knowledge of transfer mechanisms would be a plus. A BSCS or equivalent and 5 or more years related experience required.

Programmers

We have a wide variety of needs for individuals who will be involved in the development and support of our next generation interactive products. Knowledge of DECNET, X.25, local networking ARPANET or bi-sync protocols required. 2 or more years experience, BSEE/BSCS or related degree.

Send resumes to: Dept. KMG, Computervision Corporation, 201 Burlington Road, Bldg. 4-1, Bedford, MA 01730.

Management

Manager of Communications & Networking

Lead a team of communications programmers/project leaders to develop communication and networking products. You should have a minimum of 7 years experience of which at least 2 years are in a manager/project leader role. Focus of experience should be in the communication networking software development area. Specific networking experience essential. Knowledge of IBM systems is desirable.

Software Integration Manager

Two or more years experience in software integration and test, at least five of which as project leader/supervisor/manager. BSCS or related degree.

Send resumes to: Dept. KMG, Computervision Corporation, 201 Burlington Road, Bldg. 4-1, Bedford, MA 01730.

Manager, Display Devices

Individual must have personal experience in operating systems or communications development of device drivers for graphics display terminals, plotters, and other peripherals. Solid knowledge of computer science and mathematics with exposure to CAD/CAM graphics. Total of 6-10 years hands-on experience with 2-3 years in management.

Send resumes to: Dept. PK, Computervision Corporation, 201 Burlington Road, Bldg. 4-1, Bedford, MA 01730.

Database Systems

Members of Technical Staff

Bring plus years experience with large scale system design with at least 5 years experience in an IBM environment. A knowledge of database management systems (relational), VM/CMS and CAD/CAM desired. Good communications skills and the ability to lead a development project required. BSCS or MSCS or equivalent.

Systems Analysts

Analyze engineering or manufacturing problems and translate into system design. Previous experience as a systems analyst in a manufacturing environment required. Must have participated as a member of a design team. Knowledge of structured analysis methodology required. BSCS or equivalent, 3 or more years experience including VM/CMS.

Systems Programmers

Install and maintain software under VM. BSCS or equivalent and two or more years experience in an IBM environment under VM.

Send resumes to: Dept. KWG, Computervision Corporation, 201 Burlington Road, Bldg. 4-1, Bedford, MA 01730.

Software Systems Design & Quality Assurance

Communication Testers

Design software tests and automated test tools to evaluate internal operating system consistency. Experience with 16 or 32-bit microprocessor. Familiarity with 68000 and UNIX. Knowledge of Fortran 77 and "C". Additional experience on 3780, 2780, SNA, HASP, or X.25. 2-4 years system software experience with BSCS Math or Physics.

Systems Product Testers

Design diagnostic test package for hardware systems function. Detect Rev and firmware needs. Package to be used as operating systems test. Requires 1-3 years experience, BSEE or CS with hardware knowledge, and familiarity with 16 or 32-bit microprocessors, and disk, tape and terminal hardware interface.

Integration Specialists

Experience with Fortran, Assembler and "C" programming. Individual to work in a technical environment with Beta Site support responsibility. Field service or some customer exposure. Requires strong interpersonal skills. BSCS preferred.

Send resumes to: Dept. PK, Computervision Corporation, 201 Burlington Road, Bldg. 4-1, Bedford, MA 01730.

Software Engineering

Operating Systems Project Leader

Immediate need for an individual to head team in the development of next generation operating systems. Requires solid background in OS design/development and excellent people and project management skills.

Software Tools

Applications programmers with some operating systems exposure for development of screen editors, converters, and other software productivity tools. Strong group skills and ability to interface with programming community required.

Solids Modeling

MS or PhD math or applied math and broad software experience from systems to application programming. Will develop modules for solid and geometric modeling.

UNIX Systems

Individual contributors with experience in development of Operating Systems. Experience with UNIX, Pascal, and "C" desirable.

Compilers/Languages

Development of family of 5 portable compilers, and interactive source level symbolic debugger, a portable linker and optimized code generator. Implementation language is a proprietary block structure language of the same family as Pascal or ALGOL 60 and was designed to support development of portable operating systems. Development is done exclusively in high level languages.

Graphics Software

Key position for an individual with 5 or more years experience in graphics software development. Must have expertise with graphics algorithms such as hidden line/surface removal, shading and microprocessor-assisted graphics functions for CAD/CAM applications. BSCS or equivalent, MS desirable.

Send resumes to: Dept. RWB, Computervision Corporation, 14 Crosby Drive, Bldg. 14-3, Bedford, MA 01730.

Programmers

Positions exist at all levels for individuals with a thorough knowledge of Fortran, Assembler, "C", or other high level language. Demonstrated ability in software or testing design. Some experience with compilers or graphics processors desirable. Requires a BS or MS in Math, CS, Physics or related field.

Technical Trainer

Technical ability in CS and Math. Strong interpersonal and teaching skills. Management experience in developing a technical training program for R&D environment. Course will include new hire training and other course developments as the need arises. 5+ years of experience in technical software environment. Must have expertise in Fortran.

Send resumes to: Dept. PK, Computervision Corporation, 201 Burlington Road, Bldg. 4-1, Bedford, MA 01730.

Diagnostics

Diagnostic Engineering Software Department

Diagnostic Operating System design and implementation of diagnostic program/systems for a Diagnostic Executive used for a new generation of CAD/CAM systems. Familiarity with real-time operating systems, disk file systems, and user friendly interfaces is a plus. 68K microprocessor, Assembly language programming, "C", UNIX. BSEE/BSCS and 3-7 years.

Network Diagnostics

You will have the responsibility for the current and future on-line network diagnostics. Involves interfacing with the operating systems and communications software groups. Familiarity with Ethernet, DECNET, Fortran, and Pascal is helpful. 2-5 years experience with BSEE.

Microdiagnostics

Develop microdiagnostics for state-of-the-art hardware. Requires background in both Computer Engineering and Diagnostic Programming. 2-5 years experience with BSEE.

Module Diagnostics

Develop diagnostics in Assembly or "C" language for the functional verification of I/O hardware for communications, graphics and mass storage. Knowledge of I/O subsystems required. 2-4 years experience with BSEE/BSCS.

Send resumes to: Dept. JBS, Computervision Corporation, 201 Burlington Road, Bldg. 4-1, Bedford, MA 01730.

We offer an excellent compensation and company-paid benefits program including medical, dental, disability and life insurance, educational reimbursement and retirement, stock purchase and bonus incentive plans.

The listed openings are representative of opportunities available within our development organization. To explore additional management and individual contributor positions, please send resume to the most appropriate department.

*Nobody
Does It
Better*  **COMPUTERVISION**

position announcements	position announcements	position announcements	position announcements	position announcements
------------------------	------------------------	------------------------	------------------------	------------------------

Systems

Technical Marketing Specialist

If SNA/3270 is your language... at Burroughs it speaks opportunity!

Burroughs, recognized worldwide for our innovation, product quality, positive marketing and success, continues to strengthen our leadership position within the information management systems marketplace.

To keep pace with fast-developing industry changes, an excellent new career opportunity has been created within our World Headquarters' Distributed Systems department. Your technical expertise will provide valuable pre- and post-sales support for the implementation of microcomputer communications to an IBM host. In addition, you will act as company liaison between sales force and clients to assist in the development of training material for non-company mainframe communications, and provide post-systems installation consultations.

We require at least 4 years' systems analysis/ systems engineering experience in either IBM mainframe, SNA 3270 and/or 2780/3780. A BS in computer science, math or a related technical field, as well as outstanding verbal and written skills and the willingness to travel approximately 30-40% is necessary.

We offer an excellent salary and benefits, and advancement commensurate with achievement. For immediate consideration, please forward your resume, including salary history, in confidence to:

Manager, Professional Employment
Suite 1C30 CW
Burroughs Corporation
Burroughs Place
Detroit, MI 48232
An Affirmative Action Employer

Burroughs

HP 1000 SYSTEMS PROGRAMMER

Travenol Laboratories, Inc., an international leader in Health Care Products and Services, has an immediate opening in their manufacturing facility near Marion, N.C. due to expansion of the Data Processing Department. Travenol Laboratories, Inc. is the fastest subsidiary of Baxter Travenol Laboratories, Inc. one of the fastest growing companies in the Fortune 500.

The successful candidate will be responsible for system performance, installation of software releases, installation of new devices, analysis and resolution of system problems. This individual will utilize two (2) 2 Meg H.P. 1000 systems.

The following skills are required:

- A minimum of 3-5 years total D.P. experience
 - 2 years system programming experience on the H.P. 1000
 - Knowledge of RJE-6, DS1000, and Data communication
- Experience listed below would be considered a plus:
- Manufacturing environment
 - C.I.S. Lab. Manager
 - IBM 8100 and/or IBM S/38 system programming
 - ANSI COBOL

We offer a challenging atmosphere with excellent benefits and working conditions.

Please send detailed resume and salary requirements in strict confidence to:

Tom George

TRAVENOL
Travenol Laboratories, Inc.
P.O. Box 1390
Marion, N.C. 28752
An Equal Opportunity Employer M/F

MIS Manager
Salt Lake County announces recruitment for a Manager of Management Information Systems to direct the planning, implementation, integration, coordination and monitoring of the Salt Lake County MIS Systems, prepare and administer annual budget of approximately \$3 million, and manage a staff of 40. Requires bachelor's degree in computer science or other closely related fields plus 7 years of related experience, 5 years of which must have been in a progressively responsible administrative or management capacity preferably in data processing. Starting salary/range \$3,128 - \$4,854 per month depending on qualifications. Medical/dental insurance, paid holidays, vacation and sick leave, paid retirement. Send resumes and transcripts to: Salt Lake County Office of Personnel Management, 135 East 2100 South, Building #3, Salt Lake City, Utah 84115, (801) 535-7351, By October 21, 1983, Equal Opportunity Employer M/F

MICHAEL ROBERTS ASSOCIATES

a New York executive search firm, will be conducting a nationwide search for a prestigious client in New York City. Their data center is complex and sophisticated with many varied needs. We will be interviewing in Chicago, Los Angeles, Dallas and Boston for individuals with any of the following skills: TANDEM TAL, COBOL CICS, BAL, UNIVAC FIV, UNIVAC 1108 systems programmers, CICS systems programmers. Send resumes to:

MICHAEL ROBERTS ASSOCIATES
120 BROADWAY, SUITE 1719
NEW YORK, NEW YORK 10005
Resumes only!
No phone calls will be accepted.

Hardware Field Engineer

A Northwest independent maintenance organization is in need of an IBM large system trained field engineer in Portland, Oregon. Engineer must have a minimum of four years experience on IBM or IBM compatible equipment. Mini/micro experience a definite plus. Please send resume to: **Dynamic Computer Maintenance, Inc., 3609 Southwest Corbett, Portland, Oregon 97201 or call Dean Myers at (503) 241-3194.**

APL

TO \$35,000

Programming & Systems (VAX)
North Bergen County
New Jersey Location
Growth Opportunity

Resume to:

Mrs. Bennett
P.O. Box 324
Ramsey, NJ 07446

SR. PROGRAMMER ANALYST

A results-oriented professional is needed immediately for one of the leading financial institutions in the Puget Sound area. A strong securities or accounting background is required with two years programming experience in an IBM environment with assembler and fortran preferred. An undergraduate degree in accounting required; an MBA or CPA designation preferred. Salary to \$35K DOE. Send resume in complete confidence to **PERSONNEL DIRECTOR, FRANK RUSSELL COMPANY, PO BOX 1616, TACOMA, WA 98401.**

Data Processing Coordinator

Responsible for Design, Implementation, Maintenance and user training of all administrative computer systems. Bachelors degree in appropriate field or its equivalent. Minimum of 4 years of computer application and management experience. Three years of cobol programming, CICS, DOS on large main frame on-line computer system. Proven experience in evaluation and selection of computer hardware and software. Salary commensurate with qualifications.

Apply-

Personnel Office
Hawkeye Institute of Technology
1501 E. Orange Road - P.O. Box 8015
Waterloo, Iowa 50704
or call (319) 296-2320 ext. 203 for application
We are an Equal Opportunity Employer/A.A.

THE RESUME SYNDROME

19 of 20 Resumes end up in somebody's wastebasket. If you want your resume to be the 1 in 20 that gets results, send \$5.00 for our booklet, "How to Write A Resume." To receive a FREE COPY, attach a copy of this ad to your resume and mail it to:

Computer Search, Inc.
4000 MacArthur, Suite 3000
Newport Beach, CA 92660

SYSTEMS ANALYST

Leasing Systems San Francisco Bay Area

Our rapidly growing financial services corporation is recruiting a Systems Analyst to participate in the design, development and installation of a new lease administration system.

Prerequisites for the position include:

- Demonstrated ability in the design, development and implementation of large-scale financial computer system projects.
- Ability to interact and communicate effectively with all levels of staff and management.
- Minimum 5 years data processing experience preferred.
- Leasing application experience using DEC VAX systems preferable.
- A college degree plus a working knowledge of accounting principles and procedures essential.

At Phoenix, we offer a competitive compensation package, stimulating environment and superb Marin County location, just north of San Francisco.

Interested applicants should send resume, including salary history, to Personnel, Phoenix Leasing Incorporated, P.O. Box 1179, Mill Valley, CA 94941. EOE.



PHOENIX LEASING
INCORPORATED

EDP BANKING CAREERS

Major banking client companies are staffing for the "exciting" '80's. Unprecedented growth in banking has created a "demand" for qualified banking EDP professionals. If you have skills in FCS 3600/4700, credit cards, personal trust, DDA, Commercial/Personal loans, CIF or other banking applications. I have client companies who are interested in speaking to you. Positions range from Programmer(s) through Project Managers. Salaries range from \$22k to \$40k and locations include: VA, NC, SC, GA, FL, AL, TN, KY, LA and TX (other locations available). Client companies ASSUME all fees including interviewing, relocation and employment fees. If you would like to discuss your situation or would like amplification of the positions available call ME!! TOTAL CONFIDENCE ASSURED. NO OBLIGATION TO YOU EVER!

BILL DENNY, VICE PRESIDENT
JIM KING & ASSOCIATES
1840 Gulf Life Tower
Jacksonville, FL 32207
904-398-7371

Copywriter With a Flair for the Technical

We're a large, full-service Boston advertising agency with a diversified roster of clients, including a growing number in high technology. We're seeking a fire-breather of a writer—someone who can translate technological product advantages into brilliant, compelling advertising prose. This is an excellent opportunity for a copywriter with 3-5 years' experience, or a technical writer who was born to be a copywriter. Qualified applicants should send resume, plus non-returnable samples, to:

CW-B4273, Computerworld, Box 880, Framingham, MA 01701
An Equal Opportunity Employer

position announcements	position announcements	position announcements	position announcements	position announcements
------------------------	------------------------	------------------------	------------------------	------------------------

SYSTEM 38

RPG III, CL

Opportunities exist in our offices in Raritan, New Jersey, Phila., PA, Richmond, VA, and Virginia Beach, VA.

Our professional services consultants enjoy working in an environment totally dedicated to data processing, associating with peers who share professional goals, a responsive and caring management team, career diversification, and the highest degree of recognition. In short, we've created a challenging and rewarding environment for our technical staff.

We have experienced 15 years of solid growth and need additional qualified professionals to join our staff of consultants. We're looking for people with at least one year of experience using the IBM System 38.

We offer an excellent salary plus expenses, company cars (some locations), tuition assistance, life and health insurance, a stock purchase plan and in-house technical training.

To arrange an immediate interview, please send your resume in confidence to:

ARMS, Inc.

3337 Stone Shore Road
Virginia Beach, VA 23452

Analysts

WANT REAL QL/QWL*? Try New England.

Enjoy the cozy sophistication of New England, where everything is close by...including some outstanding career opportunities.

Several well established client firms in coastal and interior areas seek Analysts and Systems Analysts with experience on IBM 4341, 3081 or similar equipment with expert knowledge of OS/MVS, JCL, CICS, IMS, VM/CMS or COBOL. Also Systems Engineers with BSEE and experience with DEC VAX in CAD/CAM environment sought.

All fees, interview and relocation costs paid by client company. Send confidential letter or resume to: Sheehy Associates, Inc., Suite M, 465 Congress St., Portland, Maine 04101.

SHEEHY ASSOCIATES, INC.

Representing Equal
Opportunity Employers

*Quality of Life/Quality of Work Life.

COMMUNICATIONS SYSTEMS PROGRAMMER

Sunwest Bank of Albuquerque, New Mexico's largest financial institution and leader in automated services, is seeking a Data Communications Specialist.

This position will be responsible for the generation and maintenance of communications systems software. Prefer candidates with experience in CICS/VS, VTAM, MCP, Tandem Nonstop II and Assembler.

Salaries commensurate with experience, comprehensive benefits. Submit resume and salary requirements to: **Employment Officer, P.O. Box 1344, Albuquerque, NM 87103.**

Equal Opportunity Employer M/F

DATA BASE ADMINISTRATOR

We are seeking an individual to supervise our DBA function. Responsibilities include logical and physical design, recovery/restart procedures, data base implementation and maintenance, plus development of standards in new systems.

Three years experience in a data base position, preferably a TOTAL DBMS environment, is desired in addition to solid base structures and concepts, good understanding of data dictionary, and logical/physical development methodologies.

We are redeveloping our systems utilizing TIS TOTAL DBMS and its supported components within a large scale OS/MVS 3033/158 environment including VM/CMS, CICS and MANTIS.

We offer an excellent compensation package. Send resume in confidence with salary history to: **J. Krikau, Personnel Department, 131 West Lafayette Blvd., Detroit, MI 48226.** An Equal Opportunity Employer.

LOUISIANA STATE UNIVERSITY

Anticipates Openings For Computer Programmer Analysts

College degree or equivalent experience in an area or discipline related to administrative data processing. Should have experience in computer programming and/or analytical work. Preference given to applicants with work experience in higher education or in large scale computer systems. Applications accepted through October 10, 1983 or until suitable candidates are found. Send resume and references to:

**Ronald D. Hay, Director
Administrative Information Systems
219 K Building
Louisiana State University
Baton Rouge, LA 70803**

LSU is an Equal Opportunity Employer.

HOW TO MAKE OVER \$80,000.00 A YEAR ON CICS COMMAND LEVEL PROGRAMMING

Acquire one of the most demanded & rewarding programming skills in months instead of 3 to 5 years. A complete self-study book based on CICS latest version 1.5, written in COBOL and with special emphasis on VSAM. It covers virtually every CICS technique you will ever need. Sample programs address all CICS major applications and reflect the explosive changes in on-line environment.

It is hard to believe the learning can be so easy until you try it. In hours, you can start to create your own BMS maps; in days, you can start to write your own pseudo conversational CICS programs. Some CICS techniques are especially hard. When you are stuck for the technical problems, you'll be thankful you have this book.

Moonlighting on CICS projects is very rewarding. A typical 10-screen system can mean \$15,000 cold cash. This book also tells you how to market your services, locate the contracts, write a proposal, make a presentation, quote the right price & draw a contract agreement without a lawyer. Sample written proposal & contract agreement are included for your convenience.

How much is this book worth to you? It is hard to say until you try it. That's why we want you to use it for 10 days; if you are not satisfied, simply return it for a full refund. See how much time it saves you, how it leads you to the gold mine of programming. That's how sure we are that once you use it, nothing could make you part with it. This book will pay for itself over and over, year after year. It is in big 8.5" x 11" size, 280 technique-packed pages.

But act now. Send \$38.50 for 1, (\$32. each for 2, \$30. each for 3, \$28. each for 4 and over) by check or money order to: **CCD ONLINE SYSTEMS, INC., P.O. BOX 1170, EULESS, TX 76039.** Allow 2 to 4 weeks for delivery.

Software engineering at Kodak. Putting good things in small packages is one of our specialties.



From computerized manufacturing operations in the production of Kodak disc film to the design and fabrication of output driver chips for business systems equipment, computer professionals at Kodak excel at thinking small.

But Kodak's commitment to computer technology is big. Across the board, we have need for experienced, technically oriented computer scientists and software engineers.

Steady growth and diversification

have created opportunities in a variety of areas, from system-level architecture to the development of software for real-time command and control subsystems in complex electromechanical hardware.

If you have the necessary skills and drive to meet the challenge of working for a corporation in the forefront of technology, send your resume today to: **Personnel Resources, Eastman Kodak Company, Dept. DCPW, Rochester, NY 14650.**



Kodak. The right place. The right time.

An equal opportunity employer manufacturing photographic products, fibers, plastics, chemicals, and electronic equipment. Plants in Rochester, N.Y.; Kingsport, Tenn.; Windsor, Colo.; Longview, Tex.; Columbia, S.C.; Batesville, Ark.; and a sales force all over the U.S.

position announcements

position announcements

position announcements

position announcements

position announcements



Data Processing

Programmers & Systems Analysts

We are looking for a few good systems professionals

Not everyone can meet our standards because when you're trying to make a strong team stronger, you have to be selective. If you would like a challenging and exciting career, developing and supporting systems for the securities processing operation of one of the world's largest and most successful banks, this is the opportunity for you. And we are located in San Francisco, a city of golden promise.

Currently, we are looking for a number of both mid-level and senior professionals to participate in the development of a new and highly sophisticated on-line Stock Transfer System. Four product teams totaling 20 members will be working to develop this 2000 ALC module system to the point that it can replace our existing systems and become the system that sets the industry standards.

Exposure to a wide range of technical opportunities can be expected. Duties include significant user interface, high level systems design, program design, coding and testing.

To qualify, you will need a MINIMUM of 2 years of large scale application development and 1 solid year of IBM Assembler language experience in a 370/MVS environment. Experience with CICS, VSAM and VTAM would be considered a plus.

We offer competitive salary and benefits and the career enhancement potential that arises from being associated with one of the world's largest financial organizations. Liberal relocation benefits will be included. You'll work in San Francisco, everyone's favorite city. You'll live in an area with a never ending variety of ethnic restaurants, theater, dance and opera performances, outdoor activities on sunny afternoons, the Wine Country, Lake Tahoe and much more.

To apply, call

Toll Free 1-800-821-7700, Ext. 606,

and send resume and salary history in confidence to: **Bank of America, Management Recruitment 3442-0926B, P.O. Box 37000, San Francisco, CA 94137.** An equal opportunity employer m/f/h/v.



Bank of America

The Professional's Choice.

IMS SYSTEM PROGRAMMERS

We have an immediate need for experienced IMS system programmers to work at our Victor Center in Greer, which is located between Greenville and Spartanburg, S.C. Candidates should have at least 2 years experience in IMS DB/DC software support.

Stevens offers excellent salary and fringe benefits plus career advancement. Send your resume with salary history to the Personnel Department.

STEVENS

J.P. Stevens & Co., Inc.
P.O. Box 828
Greer, S.C. 29652

An Equal Opportunity Employer M/F/V/H

WANTED: SYSTEMS PROGRAMMERS

- 1) MVS, CICS/VS, JES2, TSO, IDMS.
- 2) VAX11/780, VAX/VMS, DTR, CDD, FMS, ADMIN\$II

Contact:
Ms. Sandy DeAngelo
609-734-1609

Educational Testing Service

Rosedale Road
Princeton, NJ 08541



Equal Opportunity Employer M/F

Consulting Systems Analyst/Programmer

B.S. Eng.; Computer Sci.; Meth or Info. Systems + 2 yrs. exp. req. will be resp. for handling an on-line banking system independent; writing programs specifications for COBOL & PL/1; required to code, test & document on-line & batch programs in COBOL & PL/1; preparing user & operations manuals of system; writing & testing JCL procedures; must interact directly with user, analyze their requirements & answer their questions; must coordinate the activities of a team of programmers & programmer trainees; will implement latest technology in structured programming in system development; responsible for defining VSAM files. Must be familiar w/banking applications & structural techniques of system development. Must have experience w/IBM 3033 (OS/MVS), IBM 4300 DOS/VS, COBOL; PL/1, OS/JCL & CICS Command level. Must be familiar w/reading OS/JCL dumps; TSO/SPF & VSAM file processing & OS/MVS utilities. Salary \$24,000 per year. Apply personnel. Send resume to **Georgia Dept. of Labor: One Peachtree St., Atlanta, Georgia 30303.** Job bank order number 156162.

COMPUTER SCIENCE FACULTY POSITIONS

Western Kentucky University invites applications for new faculty positions in Computer Science. Applicants should hold a Doctorate in the Computer Science field, or a related area with experience in the computer science field. Master's degrees will be considered for junior positions. Candidates should be qualified in one or more of the following areas: systems programming, data base theory, compilers, programming languages, data management systems, computer architecture, and operations research. Openings are available for the second semester (Jan. 1984) and for the 1984-85 school year. Positions are open until filled.

Complete resume, official transcripts, and three letters of recommendation should be forwarded to the Vice-President for Academic Affairs, Computer Science Committee, Wetherby Administration Building, Western Kentucky University, Bowling Green, Kentucky 42101. An affirmative action/Equal Opportunity Employer.

DALLAS

NEW DEVELOPMENT

Dallas Co. is staffing up for new IBM MVS installation. Openings at various levels for on-line COBOL &/or ALC exper., & high volume transaction processing. Full interview & relo. expenses pd.

2720 Stemmons Fwy. 1207F
Dallas, TX 75207 (214) 637-6360

DATA PROCESSING CAREERS

South Carolina

Permanent and consulting positions immediately available for experienced DL1, CICS or IMS programmers, systems analysts and project leaders. Fees and relocation company paid. Salaries to \$40,000.

Dunhill.

OF COLUMBIA, INC.
3700 Forest Drive • Suite 101
Columbia, S.C. 29204 • (803) 787-9767

We are currently recruiting for: PROGRAMMERS, P/A, S/P, S/A, DBA's

If we have not called you yet:
(1) We do not know who you are:
(2) Or no one has recommended you yet
If you have one year of experience or more and want to work in N.C., S.C., VA, TN or GA call one of our D.P. Recruiters collect:
Chip Groome, CPC; Diane Amos, CPC;
Jane Green; Brenda Carey
"THE DP PROS"

PERSONNEL PLACEMENT, INC.
537-D Huffman Mill Rd.
Burlington, NC 27215
(919) 584-5591

Our client companies pay all of your fees, interview and relocation expenses.

PROJECT MANAGER

Automated Systems Seattle

Throughout the state of Washington one subject is sparking a great deal of interest... Rainier Bank. A close look will explain why we're regarded as a leader among the region's financial institutions. Rainier Bank's reputation as a regional, national and international financial services organization is firmly established. We are seeking someone to manage a corporate project team in the research and development of state-of-the-art electronic delivery systems including ATMs, POS and homebanking.

We require 10 or more years' data processing experience with at least 5 years in a large scale, IMS on-line environment. Proven ability to plan and direct the efforts of others and thorough knowledge of project management methods required. Exceptional interpersonal skills with strong verbal/written communications necessary. Experience with telecommunications networks, ATM and POS systems is required.

We offer an attractive salary commensurate with your experience, complete benefits program and advancement potential reflective of your performance. Qualified candidates should send resumes to: **L.M. Tolliver, Personnel Officer, Rainier Bank, P.O. Box 3966, Seattle, WA 98124.** Your initiative in contacting us personally will be weighed more heavily than third party representation. We are proud to be a leading Pacific Northwest equal opportunity employer m/f/h/v.

Member FDIC

RAINIER BANK

We're Involved

DIRECTOR FOR COMPUTER AND INFORMATION SYSTEMS East Carolina University

East Carolina University seeks leadership for a rapidly expanding computing and information systems program for the University, its School of Medicine and Pitt County Memorial Hospital.

The Director, reporting fiscally to the Vice Chancellor for Business Affairs, will lead planning and development of information systems and resources. She/he will receive guidance from the information Systems Advisory Committee regarding formulation, interpretation and implementation of University information and data management policy. The Director will manage various information resources including the 85-person computer center staff, Burroughs 6805, Sperry 1100/63, Sperry 1100/72, and broadband communications network.

The successful candidate will hold a graduate degree, or have comparable experience, in Information Science, Computer Science, Business or a related field with at least five years of experience in broad areas of information systems applications including familiarization and expertise in areas of software, hardware and communications. Prior computer management experience is essential, preferably in an academic or health science environment. Experience working with computer consortia, or computer institutes, is preferred. It is desirable that applicants have strong orientation to distributed computing and office automation that blends microcomputers and central computing into integrated information networks with relational data bases. Ability to manage staff and resources in a complex, professional organization is essential. Salary is commensurate with experience.

East Carolina University is a dynamic, comprehensive university located in the coastal plain of North Carolina. With an enrollment of approximately 13,500 students, it is the third largest constituent institution of the University of North Carolina system. ECU is an equal opportunity, affirmative action employer.

Submit letters of nomination and/or application, resume and three letters of reference by November 1, 1983, to:

Clifton G. Moore
Vice Chancellor and
Search Committee Chair
East Carolina University
Greenville, North Carolina 27834

**GIVE YOUR CAREER
A SHOVE IN THE
CLASSIFIED
PAGES OF
COMPUTERWORLD**

Call 800-343-6474

(or 617-879-0700)

for more information

position announcements

position announcements

position announcements

position announcements

position announcements

IIT RESEARCH INSTITUTE Rome, New York

IIT RESEARCH INSTITUTE (IITRI) is an independent research organization founded in 1936 to provide research, development and design services to government and industry. Today, IITRI ranks as one of the largest and best known not-for-profit contract research organizations and continues to extend its capabilities to effectively meet research challenges of our changing society. The IITRI facility in **Rome, New York** has openings for experienced professionals with the following credentials:

Software Technology Research Manager

An experienced professional is needed to manage a group of software engineers and computer scientists performing software engineering research/development on special purpose databases.

Applicants must have a B.S. or M.S. in Computer Science or related discipline, and a minimum of 10 years experience in the computer field which must include the management of personnel.

Programmer/Analysts

B.S. or M.S. in Computer Science or related discipline, and a minimum of 2-5 years computer experience (preferably DoD applications) to formulate, organize, lead and provide major technical contributions software technology studies, prepare technical reports, and identify new business opportunities.

If you are interested in professional growth and increasing responsibility, advanced educational opportunities, and would like to live in upstate New York where you'll enjoy casual living and easy access to year around recreational activities, send your resume to: **Professional Staffing, Dept. CTC, IIT RESEARCH INSTITUTE, 10 West 35th Street, Chicago, IL 60616.** We are an equal opportunity employer M/F/V/H. U.S. Citizenship Required.



SOFTWARE SYSTEMS ENGINEERS

San Francisco Peninsula

Be a key member of a first rate R&D team and assume one of several high visibility positions that have emerged with the latest development efforts of our newest supermini computer. The BTI 8000, a true 32-bit multiprocessor system with exclusive Variable Resource Architecture, offers multiple languages, remote diagnostics and modular expandability. As an experienced computer industry professional, with a minimum of 2 years directly related experience, consider these opportunities:

Network Communications—You will participate in building a network product for the BTI 8000. Experience should include design and implementation of Operating Systems drivers and network management programs and protocols.

Utilities—You will develop and enhance system utilities for the BTI 8000 including system spooler and editor. Your background should include prior utilities development experience.

File Management—You will participate in development, enhancement and support of program modules for the BTI 8000 File Management System. Experience in ISAM or DBMS is required; knowledge of PASCAL is preferred.

Operating Systems—You will participate in enhancement and maintenance of system software for the BTI 5000 or BTI 8000. Assembly language experience on a supermini or mainframe computer is preferred.

BTI offers a competitive salary and benefits package, flexible working hours, 34 paid days off each year, an informal working environment and much more. For immediate consideration, please send resume with salary history to BTI Computer Systems, 870 W. Maude Ave., Sunnyvale, CA 94086. (408) 733-1122. An equal opportunity employer.



Programmers

For software development and computer services expertise...

...Gesco's The One.

Just ask our clients - a who's who of the financial industry. For over a decade they've relied on our large staff of experienced professionals to provide the advanced data processing services and systems that are of paramount importance to their highly technical operations.

We currently support a telecommunications network of over 7,000 ON-LINE terminals run in a large-scale, multiple CPU environment utilizing MVS/SP, JES2, CICS, ACF/VTAM, ACF/NCP, TSO and INTERACT. And as a result of our steady growth, we're seeking the following individuals to join us at our headquarters in FRESNO, CALIFORNIA.

PROGRAMMER/ANALYSTS (CICS/COBOL/ASSEMBLER)

These positions require a minimum of 4 years' CICS, COBOL, and/or Assembler programming experience within a large IBM mainframe environment. A solid background in structured programming techniques plus experience within the financial industry is REQUIRED.

TANDEM PROGRAMMER/ANALYSTS

These positions require a minimum of 2 years' TANDEM experience using TAL, ENSCRIBE and PATHWAY. Additionally, you should have Data Com experience with SDLC and BiSync Protocols. Experience with ATMs, large IBM mainframes and project management or supervisory experience is a strong plus.

SENIOR SYSTEMS ANALYST-MORTGAGE BANKING

Operating within client mortgage banking departments, you will be responsible for analyzing current operations, preparing in-depth systems design documents and coordinating the work of programmers in developing systems to achieve the results of your analysis. Strong mortgage banking experience plus excellent oral and written communications skills are required.

CICS SYSTEMS PROGRAMMER

With the responsibilities for designing and the implementation of a new CICS software installation, you are required to have a minimum of 3 years' systems programming experience in a large scale MVS environment. A strong background in TSO, SPF, SMP-4 and system utilities is preferred. Experience in a multi-CPU shared DASD environment is a plus.

Fresno is just three hours from the San Francisco Bay Area and offers an outstanding educational system, climate and AFFORDABLE housing. We offer a competitive salary and benefits package including RELOCATION.

To learn more about these challenging opportunities, send your resume and salary history in confidence to:
A.J. Newborne



ESCO corporation

3747 East Shields Ave., Fresno, CA 93726

Equal Opportunity Employer M/F

MANAGER WIZARDS -- SOFTWARE

Currently, we have openings for technically competent, highly motivated self-starters in our newly formed San Francisco Bay Area facility.

DEPARTMENT MANAGER

We're looking for an ambitious, talented department manager with proven technical skills on DEC 10/20 operating systems. The ideal candidate will know operating systems, I/O drivers and communications software, and be adept in the design and implementation of code that enhances systems availability.

To qualify, you must have three to five years programming experience on DEC 10/20 systems and a like number of years managing a technical systems group that has performed systems design, enhancements, crash analysis, and diagnostics.

SOFTWARE SUPPORT SPECIALISTS

Your primary responsibility will be to upgrade our TYMCOM 10/20 operating software to enhance its performance, availability, and reliability. This task requires individuals experienced in the thorough analysis, design, coding, and debugging of existing and new software.

These positions require three to five years assembly language experience with micro- or macro-coding of the DEC 10/10.

For immediate consideration, please send your resume and salary history, in confidence, to Tymshare, Inc., Computer Systems and Support Division: 10231 Bubb Road; Cupertino, CA 95014; Attn: John Swarbrick.



Equal Opportunity Employer m/f/h/v

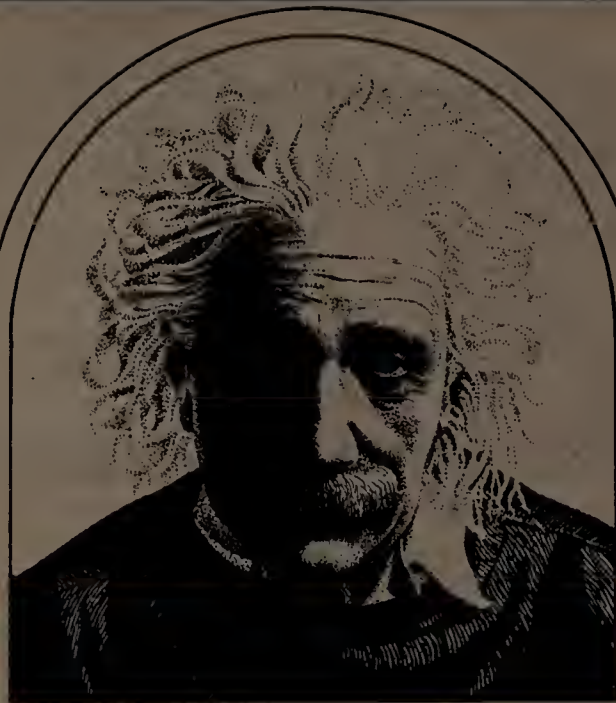
position announcements

position announcements

position announcements

position announcements

position announcements



There is no simple formula for making career decisions!

Meaningful challenge, on-going technical training and defined promotional paths are important to you...and to us as well. Our nationwide team of Data Processing specialists is trained to search for and identify opportunities that will enhance your career.

Let us direct you to the most important compensation of all, **WORK SATISFACTION.** Check your white pages and call today!



Understanding your DP needs is our first concern!®

DATA PROCESSING

E. R. Carpenter Co., Inc. is the world's largest producer of comfort cushioning materials. The growth we continue to enjoy is firmly based on superior technology, quality products and service to our customers. The EDP staff, located at the Corporate Headquarters, is expanding to better answer our present and future needs. IBM 4331 DOS/VSE serves as our main frame. DEC VAX 750 systems are now being installed in all outlying locations. COBOL is the primary language.

We seek individuals for the following key positions:

- **Vax Technical Support**—Minimum of 4 years experience, 2 years on DEC VAX 750 hardware, VMS operating system. Duties to include Systems Support and Contract Administration. College degree preferred.
- **Programmer Analysts**—with a minimum of 5 years design and coding experience in either financial (A/R, A/P, G/L) or manufacturing applications. A Bachelors Degree is required and CICS experience is required.

If you seek a challenging and rewarding position in an exceptional location, please send your resume (with salary history) to the following address. All replies confidential.

Jim Collier, Sr. Employment Coordinator
E. R. CARPENTER COMPANY, INC.
P.O. Box 27205, Richmond, Va. 23261



"World's Largest Manufacturer of Comfort Cushioning Products"
Equal Opportunity Employers m/f

HIGH TECH AND SUNSHINE!!

Software B.S.E.E. "C" UNIX \$30K+up
Software Manager M.S.E.E. \$40K
MVS Systems Programmer \$32K
Telecommunications Protocols \$35K+up
Programmer/Analyst DEC RSX \$35K+up

OMNISEARCH, INC.
THE FLORIDA EXPERTS!!
5444 Bay Center Drive
Suite 110
Tampa, Florida 33609
or call Randy Paul
(813) 875-0148

Data Processing Manager

Aggressive, \$400M Savings and Loan seeking Data Processing Manager. Job duties to include service bureau coordination, mini/microcomputer operations and light programming. Applicants should possess degree in related field and have 5 years experience with a financial institution. Send resume and salary requirements to:

Personnel Manager
People's Federal Savings
and Loan Association
P.O. Box 4600
Topeka, Kansas 66604
EOE M/F

GOLDATABase

DISTRIBUTORSHIPS AVAILABLE

GOLDATA computer services, Inc. is pleased to offer non-exclusive distributor licenses to market GOLDATABase, the database management system for first-time users of IBM-PC and Apple II+/Ile. Distributors may market GOLDATABase either as is or as a specific application. Successful applicants will be supplied with sales literature, hot-line support, and applications using GOLDATABase. Interested?

Send your written response to:
Distributorships
GOLDATA
Computer Services, Inc.
2 Bryn Mawr Avenue
Bryn Mawr, PA 19010
or call us at (215) 525-1036

HIRING?

More computer people read Computerworld than any other newspaper in the United States - more than half a million computer people every week.

And, among our 529,650 readers at user organizations, about half claim to look at recruitment ads at least every other week (only a small percentage say they never look at recruitment ads).

No wonder Computerworld carries more recruitment ads for computer people than any other publication.

To place your ad or to get a rate card with complete details on Computerworld Classifieds, call or write:

Classified Advertising
COMPUTERWORLD
Box 880
Framingham, MA 01701
1-800-343-6474
617-879-0700

TELECOMMUNICATIONS OPPORTUNITIES

At Hitachi America, Ltd., our objective is to develop telecommunications products that will be the standards for tomorrow. We offer experienced Engineers an ideal career situation...challenging positions in a growing organization, working in an ideal location situated in Atlanta, Georgia. Opportunities immediately available include:

Systems Programmer: Provides software support for MVS operating system and development of JCL and tools as needed by design organization. Requires knowledge of PASCAL, PL/1, or Algol, plus BAL and COBOL. Two to four years experience, with degree in Computer Science, is also required. (001)

Software Product Designer: Designs and develops PBX system software. Must have knowledge of PASCAL, PL/1, or Algol, Assembly language. Requires 2-4 years experience in PBX SW design, or other real-time system, with degree in Computer Science or EE. (002)

Hardware Systems Engineer: Evaluates and develops enhancements to PBX system architecture, working with high-level and detail-level design. Requires 2-4 years digital design experience, preferably within telecom industry, with BSEE or MSEE degree. (003)

Customer Engineer: Provides primary technical interface between manufacturing engineering and customers. Requires 2+ years telecom industry, BSEE degree or 5+ years experience with an AS degree. (004)

If you would like to learn more about the challenges and rewards that exist in this dynamic environment, send your resume, including salary history and position number applying for, to:

HITACHI AMERICA, LTD.
Attn: Phil Kozlowski, Asst. Manager - Personnel
Telecommunications Research & Sales Division
6745 Peachtree Industrial Blvd.
Atlanta, GA 30360

Equal Opportunity Employer M/F/H/V



HITACHI

Manager Patient Accounting Systems

Our three-year plan for development of a comprehensive Hospital Information System and a supporting local communication network includes substantial staff increases in Systems Development, Computer Operations, and Systems Programming. This means technical challenge, hard work, and opportunities for our current staff as well as for the manager of Patient Accounting Systems.

General Job Responsibilities include coordination of in-house personnel with software installation consultants and participation in the conversion from a service bureau to an in-house IBM environment during 1983. Application software is Medipac Patient Accounting as developed by Whittaker Medicus. Additional new system development is planned for 1984 and beyond.

General Requirements: IBM experience is mandatory. Previous experience in the health care industry and with the installation of packaged software is preferred. Four to six years data processing experience with a minimum of one year at a senior level.

Environment includes an IBM 4341-11 running under VM and DOS/VSE with CICS, VTAM, VSAM, VOLLIE, LIBRARIAN, DYNAM-T and DYNAM-D.

No Agencies Please

Metropolitan Medical Center is a service of CenterCare
An Equal Opportunity Employer

Please submit your resume and salary history to:



Employment Department
Metropolitan Medical Center
900 South 8th Street
Minneapolis, MN 55404

SURREY FIELDS CORPORATION

Aggressive national firm headquartered in Southwestern Kentucky undertaking extremely active expansion program has need for 2 key executive positions to be filled by individuals with the following skills and qualities:

DATA PROCESSING EXECUTIVE

- Keen understanding of mail order, mailing list mgmt., and retail showrooms operations.
- Strong interpersonal skills in an open interactive environment with other key executives.
- Proven leadership ability to manage people & to fast-track projects.
- Strategic planning abilities for hardware, software and personnel to support growth plan.
- Mainframe & mini experience.
- Communications experience helpful.
- 7 years experience in top data processing positions essential.

Send resume, references & salary history:

Surrey Fields Corporation
C/O William L. Johnson
Beech Bend Road
Bowling Green, KY 42101
NO PHONE CALLS PLEASE

position announcements

position announcements

position announcements

position announcements

position announcements

BRIDGESTONE TIRE COMPANY OF AMERICA, INC.

Due to an on-going expansion, outstanding career opportunities exist in the data processing department, located at our Corporate office in the Los Angeles area, for the following positions:

PROGRAMMER ANALYSTS

Minimum of 7 years experience with OS/COBOL, OS/JCL, VSAM, and at least 3 years experience with OS/CICS (Command Level). Experience with DMS, DLI, Panvalet and TSO/SPF is desirable.

MVS SYSTEMS PROGRAMMER

Requires a total of 8 years systems experience with extensive knowledge of MVS internals. Responsibilities will include installation, modification, maintenance and performance tuning of systems software including MVS/SP, TSO, JES2, VM/370 and associated program products and support software.

SYSTEMS ANALYST

Minimum of 8 years data processing experience with at least 3 years as a systems analyst. Requires experience with large IBM mainframe in an OS/MVS, DLI, VSAM, CICS, TSO/SPF, COBOL environment.

Applications background for the above positions should include most of the following: A/P, A/R, G/L, order entry, billing, cash receipts, inventory, sales reports and marketing forecasts.

An excellent benefits package is offered and salary is commensurate with experience. Qualified applicants should send their resume including salary history to:

BRIDGESTONE TIRE COMPANY OF AMERICA, INC.

P.O. Box 2964

Torrance, CA 90509

Attn: Personnel Department #CW

An Equal Opportunity Employer M/F/H/V

AVCO Has A Unique "Hands-On" Engineering Environment

AVCO ELECTRONICS, a rapidly growing division of AVCO CORPORATION, has designed, built and installed some of the largest and most sophisticated distributed-network systems in the world. These are used for facility management (HVAC, fire & security), remote supervision (SCADA), EMCS, engine test and process control.

SOFTWARE ENGINEERS

Needs two or more years experience in real-time data acquisition and control applications. Requires BS in Electrical Engineering, Computer Science, Physics or Math or equivalent experience and a background in Fortran and assembly language. Experience with DEC mini-computers.

COME TO THE CITY BETWEEN THE
MOUNTAINS AND THE RIVER
AND LIVE IN AN UNBEATABLE
SUNBELT COMMUNITY WITH
MULTI-RECREATIONAL AND
CULTURAL DIVERSIONS.

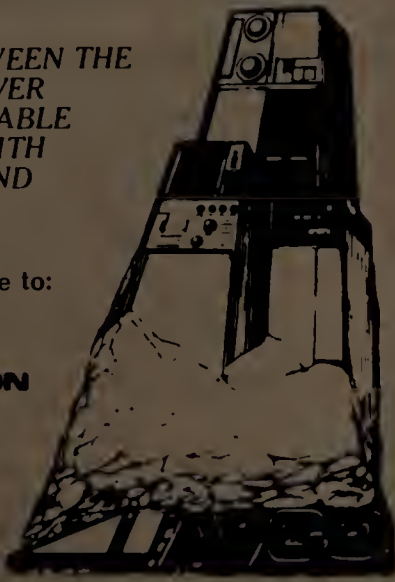
For consideration, send resume to:

AVCO
ELECTRONICS DIVISION

4807 Bradford Drive
Huntsville, Alabama 35805

Telephone: (205) 837-6500
or Toll Free: (800) 633-7202

Equal Employment Opportunity and Affirmative Action Employer



PROJECTS OF GREAT IMPORTANCE

Mean NUMEROUS CAREER OPPORTUNITIES

As a prominent member of the NASA/Industry Team involved in essential, space-related projects in the Baltimore/Washington area, Bendix Field Engineering now has numerous career building opportunities for qualified technical professionals. Our latest projects include engineering, operation, and maintenance, a software support system for the Tracking Data Satellite System (TDRSS) Network, and a Mission Operation Support Service (MOSS) Contract for the Payload Operation Control Center at the Goddard Space Flight Center. These are just two of the many challenging Bendix Programs you can be part of!

If you have expertise in any of the following areas, we wish to talk to you: SYSTEMS ENGINEERING; REAL TIME SPACECRAFT CONTROL SYSTEMS; SPACECRAFT COMMAND MANAGEMENT SYSTEMS; SOFTWARE VERIFICATION AND VALIDATION; SYSTEMS SOFTWARE; COMMUNICATIONS SOFTWARE.

In addition, experience utilizing any of the following computer systems is desirable: PDP-11/34; PDP-11/44; PDP-11/70; VAX-11/780; IBM 4341; SIGMA 5; SIGMA 9; HP1000; IBM 360/65; UNIVAC 1100.

If you possess a BS Degree in Computer Science, Math, Physics or Engineering, and have experience related to the previously mentioned areas, you may qualify for one or more of the following MOSS Project positions:

- PROGRAMMER - (1 yr. related exp.)
- SR. PROGRAMMER - (3 yrs. related exp.)
- PROJECT SYSTEMS ANALYST - (5 yrs. related exp.)
- SR. PROJECT SYSTEMS ANALYST - (7 yrs. related exp.)

Or, consider these openings with our TDRSS Network Project:

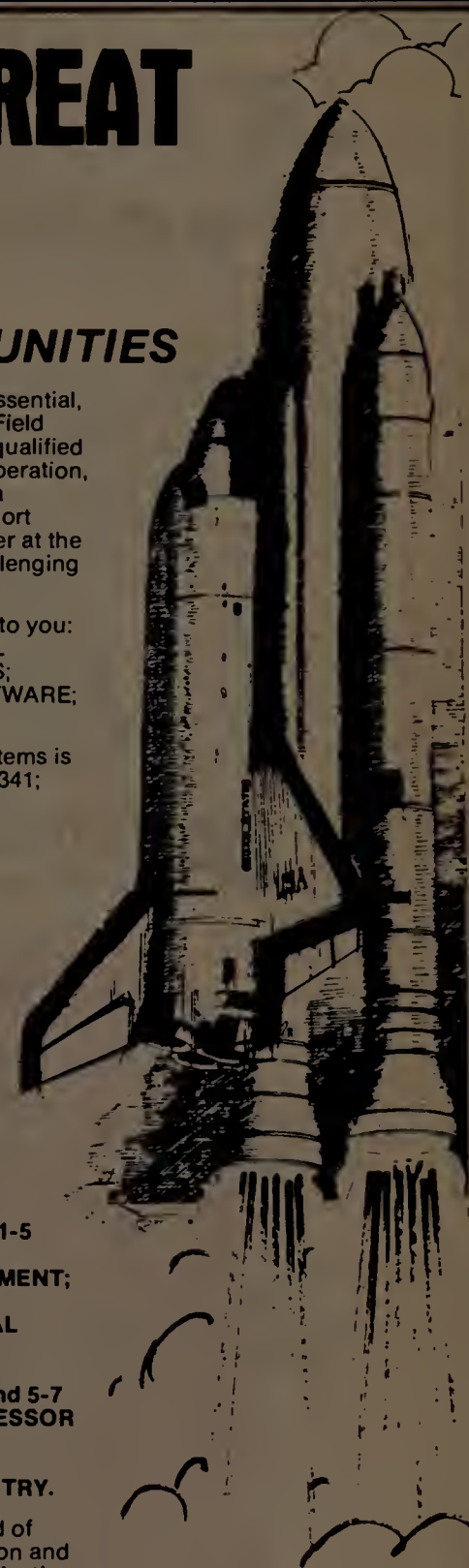
- SYSTEMS ANALYSTS - Requires BSCS/BSEE and 1-5 years experience in one or more of the following: SIMULATION MODELING; PERFORMANCE STUDIES; CONCEPT DEVELOPMENT; SYSTEM ENHANCEMENT; WORK LOAD STUDIES; FAULT ISOLATION; TEST ANALYSIS; DOD SECURITY; OPERATIONAL REQUIREMENTS AND ANALYSIS.
- SYSTEMS ENGINEERS - Requires BSCS/ BSEE and 5-7 years experience in one or more of the following: MICROPROCESSOR LAB SUPPORT; HARDWARE ASSESSMENT; HARDWARE/SOFTWARE TRADE OFF STUDIES; TEST DEVELOPMENT & EVALUATION; HARDWARE SPECIFICATIONS; VIDEO CIRCUITRY.

Take advantage of these opportunities to share in the Bendix world of achievement and recognition. For prompt, confidential consideration and response, call us TOLL FREE: 1-800-638-7816, or send resume indicating desired position and salary requirement to: Dept. NA03, One Bendix Rd., Columbia, MD 21045. We are an equal opportunity employer m/f.



Field Engineering Corporation

Subsidiary of the Bendix Corporation



VITRO OPPORTUNITIES

HP3000 PROGRAMMER (Long Beach, CA)

VITRO CORPORATION has immediate permanent job opportunities for HP3000 Programmers in the Long Beach, CA area. Requires BS in Computer Science, Math or similar scientific discipline with 3+ years programming experience. Requires experience utilizing HP3000 and HP IMAGE, QUERY, and VIEW support software in program definition, development and implementation. Individual will perform system analysis and develop computer programs to accommodate material requirements, planning applications and a variety of other projects within a large industrial facility. Independent interface with customer's technical representatives is required.

VITRO offers competitive salaries and an excellent benefit package. If interested, please call (805) 487-5411 during the week or forward your resume with salary history to: Howard D. Speck.

Vitro CORPORATION

2345 Statham Blvd.
Oxnard, CA 93033

U.S. CITIZENSHIP REQUIRED
An Equal Opportunity Employer M/F/H

Telecommunications Consultant

Our Bay Area client is seeking an individual who can consult to systems and product groups for use of data communications technologies. Specific skills should include:

- 8-10 years technical background in data communications,
- Experience with 3705, SNA/NCP, VTAM and networking,
- Budgeting/cost benefit analysis,
- Strong communication skills and interface with senior management.

Excellent compensation package. We are consultants to management. For immediate and confidential consideration, please send detailed resume and salary history to Betsy Garrison, Professionals for Computing, Inc., (Search & Personnel Services), One Maritime Plaza, Ste. 1350, San Francisco, CA 94111, (415) 956-7120. Employer assumes fee.

professionals for
computing, inc.

MAINE

We have specialized in data processing professional placement in Maine for almost a fifth of a century. If you qualify for positions in the \$25-40,000 range, please contact us in total confidence. Our clients pay our fees and provide relocation assistance.

ROMAC

477 Congress St.
Portland, Maine 04101
(207) 773-4749

position announcements

position announcements

position announcements

position announcements

position announcements

In Florida or Texas, the outlook is sunny with E-Systems.

E-Systems is an electronic systems company working at the very leading edge of technology. The company has a solid record of growth and profit.

In fact, the FORTUNE 500 directory shows that E-Systems is number one in total return to investors over the past 10 years.

So with E-Systems, you not only have the rewards of working to shape the future of technology, you also have the security and benefits of one of the most solid companies around.

The best of both worlds.



E-SYSTEMS

The problem solvers.



The ECI Division in St. Petersburg has a place in the sun for talented Data Communications Professionals.

The ECI Division develops and produces military communications systems, electronic data-handling systems and microwave phased array antennas.

Member Technical Staff — Software — To serve as Technical Consultant for the Division's Software products. Minimum of 10 years real-time systems design and implementation experience required as well as strong background in Mathematics, Digital Interfaces, Digital Communications, and DOD Software Development Methodologies.

Software Designers — BSCS/BSEE and five years experience in real-time embedded computer systems utilizing assembly and higher order languages. Significant hardware/software interfacing experience, and the ability to perform analysis, design, and implementation of sophisticated weapon system software.

For immediate consideration please forward your resume to: **Mr. Tim Harris, Director of Employee Relations, E-Systems, Inc., P.O. Box 12248, St. Petersburg, FL 33733.**

The Garland Division in Dallas has "heart-of-the-sunbelt" opportunities for talented Software Professionals.

The Garland Division is involved in high tech communications, command and control systems, electronic warfare, computer-based intelligence and reconnaissance systems, and digital image processing.

SENIOR SOFTWARE ENGINEERS

Experienced Software Engineering Professionals in all areas including:

- Office Systems Specialist — With WANG OIS experience, communications/networking experience a plus (develop long-range office systems plans)
 - Data Base Administrator — VAX system using VMS
 - Artificial Intelligence Specialist
- Prefer 6 years experience for all positions.

SOFTWARE ENGINEERS

Requires a BS in EE or Computer Science with experience in Pascal. Prefer a strong math and science background with experience in Data Base Administration and VAX Systems Programming. VAX 11/780 experience highly desirable.

For immediate consideration please forward your resume to: **Professional Placement, Ann Olson, E-Systems, Inc., Garland Division, P.O. Box 226118, Dept. 41, Dallas, Texas 75266.**

An equal opportunity employer M/F, H, V.

LIFE 70

LIFE COM

Prj. Mgr.
Sr. P/A
Prj. Mgr.
Sr. Phys. DB
Sr. S/A
Bus. S/A
P/A
P/A

CFO

Fla. To \$50K
N.Y. To \$43K
TX. To \$38K
TX. To \$38K
TX. To \$36K
GA. To \$35K
TX. To \$34K
MO. To \$30K

We specialize in insurance systems nationwide. The above is a few of our many openings.

Executive Consultants
1600 Fairfield, Suite 102
Shreveport, LA 71101
(318) 222-1000

HP 3000

Data Processing Manager El Paso, Texas

We need an individual to perform the managerial and technical functions in an interactive database environment. Duties will include system management, system design and implementation, user interface and training, and supervision of programming and operation. Solid financial applications background and communication skills are essential. Send resume and salary history and requirements to: **CW-B4272, Computerworld, Box 880, Framingham, MA 01701**

PROGRAMMER/ ANALYST

Immediate opening for mature person at large savings and loan. Four years programming in Cobol in Burroughs Medium System Thrift environment required. Prefer degree in Business Data Processing or equivalent. Must work with user departments and have ability to schedule and supervise activities of a junior programmer. Send resume to:

Empire of America FSA
Tarrant Savings Division
P.O. Box 2930
Fort Worth, Texas 76113
Equal Opportunity Employer

COMPUTER ENGINEER

Computer Engineers; 40 hours per week-9am to 5pm; \$27000 yearly income. Job duties entail: Trouble-shooting and maintaining computers sold by the company. Design of information systems, development, implementation and installation of systems and application software. Job requirements are: Master's degree in Electrical Engineering specializing in Computer Engineering; knowledge of DX-10, CP/M, UNIX operating systems; knowledge of Pascal, C and Assembler languages. Send resume to **Ohio Bureau of Employment Services, 1916 Central Parkway, Cincinnati, OH 45214. Job Order Number: 0595615**

SNA SPECIALISTS

Major Fortune 500 corp located in a beautiful Phila suburb has retained us to identify dedicated Communications Professionals experienced in the design and implementation of communications networks and associated applications. Candidate should have heavy experience in such areas as SNA, DCA or BNA, communications systems software, protocols and layered structures. Salaries DOE. Complete reloc package. Immediate interview. Call Now.

Scientific Search, Inc.
Plaza Office Ctr., Suite 200
Route 73 & Fellowship Rd.
Mt. Laurel, NJ 08054
(609) 866-0200

GOOD THINGS HAPPEN ON THE CHESAPEAKE BAY

We're Dynamac Corporation, Information and Management Systems Division. We've built our success on a history of quality service.

- Development of complex online DBMS applications.
- Innovative use of powerful mini-computer technology.
- Design of large-scale distributed systems.

**** IMMEDIATE OPENINGS ****

UNIVAC 1100 ... TANDEM 16

**SENIOR AND INTERMEDIATE LEVEL POSITIONS
SYSTEMS AND APPLICATIONS**

FOR

- PROJECT/TASK MANAGERS
- DATA BASE ADMINISTRATORS/ANALYSTS
- SYSTEMS ANALYSTS/DESIGNERS
- PROGRAMMER ANALYSTS

EXPERIENCE DESIRABLE

UNIVAC: DMS, QLP, TIP, ECL, COBOL
TANDEM: NSI & II, TAL, ENCOMPASS, XRAY, EXPAND
STRUCTURED TECHNIQUES: ANALYSIS, DESIGN

**Salaries To 50K
U.S. Citizenship Required**

To Schedule Interview:

Call Susan Collect at (301) 468-2500 and Send Resume To:

**DYNAMAC
CORPORATION**

PAX PROJECT
c/o Personnel Dept.
11140 Rockville Pike
Rockville, MD 20852

**SUCCESS THROUGH QUALITY
AN EQUAL OPPORTUNITY EMPLOYER**

WASHINGTON, D.C.

DBA/30XX

Start fresh! Major DC metro area firm is building a new data center. DBA candidate must have 5-10 yrs. of IDMS, IMS, DL1, SK2, ADABAS or TO-TAL. \$40-60K

ROBERT HALF

OF WASHINGTON, INC.
7316 Wisconsin Ave Ste 401
Washington, D.C. 20014
(301) 652-1960

TECH SUPPORT

TECH SERVICES MANAGER To 45K
Top client requires strong MVS and management experience to lead team of four Systems Programmers. Forthcoming projects include XA.

VM SYSTEMS PROGRAMMER To 40K
High tech firm seeks VM professional to lead CMS based information center project. Both opportunities are located in Central New England and offer excellent relocation packages. Contact Deb Liebes.

Dunhill

of Worcester Inc.
370 Main St. Ste. 730
Worcester, MA 01608
(617) 796-0116

Technical Training Instructors

Tymshare, a leader in the management of computerized information and communications services, has immediate openings for experienced instructors in its San Francisco Bay Area national training facility.

You will use your technical knowledge and expertise to train personnel for our rapidly expanding computer maintenance organization. Experience instructing PDP-10/11, VAX-11 family, or Perkin-Elmer hardware is required.

The ideal candidates will be offered a competitive salary and a comprehensive benefits package. For immediate consideration, please send your resume and salary history, in confidence, to Tymshare, Inc.; Computer Systems & Support; 39100 Liberty Street; Fremont, CA 94538; Attn: Carson Janes.

TYMSHARE

Equal Opportunity Employer m/f/h/v

position announcements	position announcements	position announcements	position announcements	position announcements
------------------------	------------------------	------------------------	------------------------	------------------------

BRYANT BUREAU HAS THE COMPUTER PROGRAM FOR YOU

If you're not accomplishing your career goals, let us put you in the right environment. Our national database of client companies are continually looking for progressive DP professionals who want to remain state of the art.

IBM MVS Systems Programmer	to \$36K
IBM VM/CMS Software Specialist	to \$35K
IBM IMS/DL1 Pgrmr. Analyst	to \$33K
IBM Manufacturing Pgrmr. Analyst	to \$29K
IBM CICS Programmer	to \$28K
IBM IMS Systems Programmer	to \$26K
HON Data Comm. Specialist	to \$41K
HON Systems Analyst	to \$35K
BUR Project Leader	to \$32K
DEC VAX Systems Manager	to \$40K
DEC VAX Sr. Systems Pgrmr.	to \$38K
NCR Neat III Applications Pgrmr.	to \$33K

To become part of the growth in the 80's, contact the DP Division below.

Bryant Bureau®

DP Division
4000 S. Tamiami Trail, S-508
Sarasota, FL 33581
(800) 237-9497

COUNSELOR/ PLACEMENT MGR

High base salary & incentives
& xint fringe pkg.

Our EDP placement dept is heavily supported with local & nat'l advertising. If you have a proven track record in data processing, are sales oriented, need challenge and want to participate in building a department in Southern California, contact Paul Gilbert, Robert Half Personnel, (213) 386-6805



ROBERT HALF

OF SOUTHERN CALIFORNIA
3600 Wilshire, Suite 2000
Los Angeles, CA 90010

We've got lobsters. What we need are data processors.

Help.

Maine has tons of lobsters and forests, lakes and mountains. What Maine could use more of are top-notch data processing professionals.

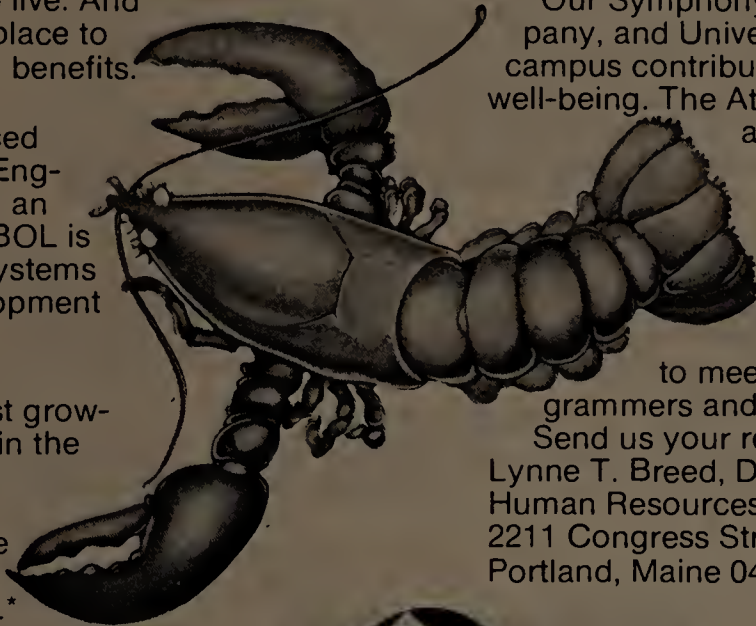
Maine is an outstanding place to live. And Unionmutual is an outstanding place to work, with excellent salaries and benefits.

State of the art

We have one of the most advanced technical environments in New England, including an IBM 3081 and an Amdahl V6 under OS/MVS. COBOL is the primary language. On-line systems utilize CICS and program development is provided through CMS.

A dynamic company

Unionmutual is one of the fastest growing life insurance organizations in the country, a Fortune 50 insurance company with over \$3 billion in assets. And for seven years, we've sold more Long Term Disability coverage than any other insurer.*



A dynamic city

Portland, our home office location, has seen remarkable growth including a \$5 million public library, a new Art Museum Building, and the Cumberland County Civic Center.

Our Symphony, Stage Company, and University of Maine campus contribute to our cultural well-being. The Atlantic is seconds away, skiing minutes away and Boston only two hours away.

Let's talk.

We're anxious to meet crackerjack programmers and systems analysts. Send us your resume. Write to Lynne T. Breed, Dept CW-9/83 Human Resources, Unionmutual, 2211 Congress Street, Portland, Maine 04122.



Unionmutual

Putting your future in a whole new light.

An Equal Opportunity Employer

*Employee Benefit Plan Review, April 1983

NRL

SUPERVISORY COMPUTER SPECIALIST

GM-13 (potential to GM-14)
\$34,930 to \$45,406 per annum
(salary dependent upon qualifications)

The Research Computation Division is seeking a Computer Specialist to head the Timesharing Computer Branch which operates a central timesharing facility, utilizing a DEC-10 and a VAX-11/780 system, for the Laboratory's research and support divisions. Manages through subordinate section heads an extensive program of systems analysis, complete user services, maintenance and enhancement. Develops hardware, software, and systems proposals/specifications, establishes scheduling policies, resource usage, accounting systems, and computer hardware configurations.

Ability to manage computer systems, knowledge of systems analysis, and knowledge of mathematics and computer programming for scientific applications are required. Experience with a timesharing computer system serving a wide variety of users is essential.

Interested persons should submit a Personal Qualifications Statement (SF-171) or detailed resume on or before 13 October 1983 to:

NAVAL RESEARCH LABORATORY
Civilian Personnel Division
Attention: 28-022-11.2:EL(CW)
4555 Overlook Avenue, S.W.
Washington, D.C. 20375

An Equal Opportunity Employer U.S. Citizenship Required

Your future is in Florida!

Florida's most prestigious consulting firm is looking for EDP Professionals to move up to consulting status. What better place to make the moves than in the exciting, fast growing Sunshine State.



For the Orlando area, we are looking for programmers and programmer / analysts with the following qualifications:

- Hardware: IBM System - 38
- Application: Strong Manufacturing Background



For the West Coast area, we are looking for programmers and programmer / analysts with the following qualifications:

- Hardware: IBM Series /1, VAX 11 / 780
- Software: Assembler, EDL, EDX (Point-of-Sale experience preferred), DIBOL, VMS



For the Sarasota area, we are looking for Programmer/Analysts with the following qualifications:

- 3600/4700 Banking Terminals, BAL, FCL, IMS or IDMS

Send resume, along with salary history, to:
Mr. Fred Pawlaczyk
Corporate Technical Manager, at the address below:



SOFTWARE SERVICES INC.

A subsidiary of Orbitron International

One Plaza Place, N.E. • Suite 400 • St. Petersburg, FL 33701
(813) 823-7138

ATTENTION APPLICATION DEVELOPMENT PROFESSIONALS

Are you challenged by your current working environment? If not, there is an abundance of opportunity and challenge in Baltimore, MD; Central PA; Washington, D.C.; Philadelphia, PA; Wilmington, DE; and Seattle, WA.

Comp-u-Staff is seeking to hire experienced analyst/programmers to work in Fortune 1000 client accounts. Comp-u-Staff is a growing, professional services company that offers high salaries, performance bonuses, excellent benefits, expense accounts and training programs.

If you would like to relocate and have four or more years development experience using:

IMS (DB/DC) CICS (DL1)

Call or send a resume to:

Comp-u-Staff®

Attn: RECRUITMENT DEPARTMENT
1 INVESTMENT PLACE, BOX C20 TOWSON, MD 21204
(301) 828-0788

We are not an employment agency

ENDOWED PROFESSORSHIP IN APPLIED MATHEMATICS & COMPUTER SCIENCE

Claremont McKenna College (one of the Claremont Colleges) invites applications for the recently established W. M. Keck Foundation Professorship in Applied Mathematics and Computer Science. Applicants should have a Ph.D. in a computer-related field such as applied mathematics, computer science, or management information systems, a strong commitment to undergraduate teaching, an established scholarly record, and practical experience with computer applications. Expertise in areas such as simulation and modeling, operations research, numerical analysis, information science, systems design, or data-base management would be especially appropriate.

Applications for this position will be accepted until January 1, 1984. Resumes and supporting letters should be sent to:

Professor Gerald L. Bradley, Chair
W. M. Keck Professorship
Search Committee
Claremont McKenna College
Pitzer Hall
Claremont, CA 91711

Claremont McKenna College is an Equal Opportunity/Affirmative Action employer.

PRIORITY HIRING

INTERMEDIATE to SENIOR LEVELS

- Mini-Micro Systems
- Communications Networks
- Office Automation
- Simulation - SAS
- M.I.S. Applications
- Database Management Systems
- Systems Programming
- Software R&D/Design
- Manufacturing Automation
- Product Planning

DEC, HONEYWELL, IBM, NCR, UNIVAC

BRUCE A. MONTVILLE
MANAGING PARTNER

EXETER 2100

NATIONAL RECRUITING CONSULTANTS
(603) 926-6712

TOLL-FREE
1(800) 258-7328

COMPUTER PARK, P.O. BOX 4979
HAMPTON, NH 03842

position announcements

position announcements

position announcements

position announcements

position announcements

MAJOR ACCOUNT INDUSTRY MARKETING

Acknowledged as the world leader in the computer-driven Office Automation market, Wang today stands #264 on the Fortune 500 with continued sales revenue growth of over 30%. And that's still only just the beginning. Continued growth has created an excellent opportunity for a Petroleum Consultant within our Industry Marketing group.

Petroleum Consultant

Develop and implement marketing programs directed at the petroleum industry including customer presentations, account planning and consultation. Interface with field sales force and other marketing groups. Requires a minimum of 5-7 years broad based experience with a major petroleum company, systems and computing background, and good interpersonal and presentation skills. BS/BA in Business or technical discipline or equivalent required.

Leading the way in benefits

Wang offers one of the best benefit programs in the industry including profit sharing, stock bonus, long term stock option and stock purchase plans, company paid dental, medical and life insurance, tuition reimbursement and our employee country club.

Contact us today.

Send resume with salary history to Kevin Mahoney, M/S 14A2B, Dept. CW - 926, Wang Laboratories, Inc., One Industrial Avenue, Lowell, MA 01851.

We are an affirmative action employer.

WANG

The Office Automation Computer People

IMS SYSTEMS PROGRAMMER

Airborne Freight Corporation, a leading Seattle-based air-express firm, headquartered in Seattle, Washington is seeking an IMS Systems Programmer.

The successful candidate will have at least 3 years experience in system support of IMS and CICS and strong orientation to problem solving and performance analysis of on-line CICS systems using IMS/DB. Experience in project management or as a team leader preferred.

The position is responsible for capacity planning and design reviews of new data base applications and will coordinate problem solving and performance analysis in our CICS/IMS environment.

We offer excellent benefits and pleasant working conditions. Salary to 34K, DOE.

Please send resume to Esther Ross.

AIRBORNE®

FREIGHT CORPORATION
P.O. Box 662
Seattle, WA 98111

Equal Opportunity Employer M/F

PACIFIC NORTHWEST IBM SERIES 1 STAFF

SENSOR BASED SYSTEMS, a subsidiary of AZURDATA, INCORPORATED has immediate openings for the following positions:

SOFTWARE SYSTEMS ENGINEER: Requires a BSCS equivalent and at least 5 years experience in the programming environment. Must have IBM Series 1 experience and be capable of working in EDL and Assembler. Should be a selfstarter who thrives on independence. Successful candidate will be involved with the design of new order entry products.

HARDWARE DESIGN ENGINEER: Requires a BSEE or equivalent with a minimum of 5 years in the digital design of computer interfaces and communications interfaces. Successful candidate must be capable of designing micro computer interfaces to the IBM Series 1. A working knowledge of IBM Series 1 hardware and microprocessors is required. Some analog work is required.

SENSOR BASED SYSTEMS offers competitive salary and fringe benefits, and our immediate 4 week vacation policy is incomparable.

For consideration, please send your resume to:

SENSOR BASED SYSTEMS, INC. 4102 148th Avenue, N.E.
Redmond, WA 98052 Attention: Gordon Hanson

LOOKING?

Find the job you want
in Computerworld's
classifieds.

No other publication
carries as many ads
for computer
professionals as
Computerworld,
so no other publication
can give you as wide a
choice of jobs,
salary and location
as Computerworld.

You can even try a
"Position Wanted" ad
to look for exactly
what you want,
where you want.

Be sure you look over
our recruitment ads
every week, so
you don't miss
the opportunity
that's just
right for you.

33 DATA PROCESSING PROFESSIONALS

Programmers Programmer/Analysts Systems Programmers

Positions are available within the Eastern region for professionals with a minimum of 3-5 years experience in any of the following areas:

- 3 Systems Programmers MVS, CICS, Telecommunications
- 8 IMS DB/DC, OS COBOL, Insurance and/or manufacturing experience is a plus
- 3 IMS DB/DC, OS COBOL, FOCUS, Brokerage applications experience is a plus
- 2 CICS, DL/1, OS COBOL with knowledge of financial and banking applications
- 3 VAX/VMS with chemical engineering expertise
- 3 IMS DB/DC, PL/1, OS COBOL
- 2 IDMS Database Administrators
- 3 Adabas, Natural, OS COBOL
- 4 UNIX® C Software Engineers and Applications Programmers
- 2 IBM Series I, COBOL

Spiridellis & Associates' new affiliation with Cap Gemini Sogeti has made us part of the largest private DP consulting firm in the world. By joining us now, you can take advantage of our worldwide resources and reap the benefits of being involved in today's most challenging assignments.

We offer an outstanding career opportunity, as well as, excellent salary and benefits packages. Immediate tuition reimbursement available.

Please call between 10 a.m. and 2 p.m. or send your resume in confidence to: Pam Ritts,

Spiridellis & Associates, Inc.

1133 Avenue of the Americas, New York, NY 10036 (212) 221-7270

A member of the Cap Gemini Sogeti Group

*Registered Trademark of Bell Laboratories

An Equal Opportunity Employer M/F

THE DYNAMIC CONTROL CAREER ADVANTAGE...

Experience It.

Experience the revolutionary potential we've created for comprehensive data processing systems geared to total hospital and patient-care management. Experience state-of-the-art IBM System 38 and optimum computer applications for cost-effective in-house, on-line hospital and financial use.

Experience the advantages of record-breaking growth, advanced professional challenges, national and international travel, as a fast track to valuable career advancement.

Financial Installers

You will work with hospital financial staffs to assist with the installation of automated financial and accounting systems. Other duties will include training of customer personnel and system modifications. We require hospital accounting and hands on experience with an automated hospital information system.

Programmers Programmer/Analysts

Make the most of your experience in coding RPG II on a System/3 or System/34 or RPG III on a System/38 in an interactive on-line environment. We require a minimum of 2-3 years coding experience.

Today, our Hospital Patient Management System (HPMS), is of key importance in bringing patient care and data processing together in providing effective patient and financial management. In these exciting times of rapid-fire information processing breakthroughs, Dynamic Control can take you further than you ever imagined. Call us to find out more about our competitive salaries and benefits, including relocation assistance. Call **Personnel, TOLL FREE, 1-800-327-5352**, or in-state call **COLLECT (305) 671-4483** or send your resume to:



Dynamic Control Corp.

Personnel Department C/W
1311 S. Semoran Blvd.
Winter Park, FL 32792

An Equal Opportunity Employer M/F

MVS SOFTWARE SALES

Established Computer Software Company Expanding Its Western Sales Force. Straight commission - protected accounts. Part-time OK. Must be knowledgeable in IBM MVS Operations. Mature product line with over 100 Fortune 1000 Users. Exciting new products coming soon. Reply to:
CW-B4270
Computerworld
Box 880
Framingham, MA 01701

Computer Professionals

The U.S. Customs Service, Office of Data Systems, has recently installed an IBM 3081 processor, a full support data base system and supporting software of the latest technology for systems development activities.

Positions are available for:
Computer Programmers/Analysts/Equipment Analysts/Systems Analysts.

Salaries range from \$16,559 to \$53,661.

Applications will only be accepted from present and former career or career-conditional Federal employees.

To apply contact: U.S. Customs Service; Headquarters Personnel Operations Division; Staffing Branch; 1301 Constitution Avenue, N.W.; Room 6124; Washington, D.C. 20229 (202) 566-2710. Employer will pay relocation costs.

position announcements

position announcements

position announcements

position announcements

position announcements

Product Manager

We seek a forward-thinking individual with a keen sense of business purpose to get involved in the design of product development strategies, product marketing strategies, and the definition of product requirements for the software we create. In the important role of a Product Manager, you will coordinate a product through development, promotion and release. You will also have the opportunity to develop and coordinate the execution of business plans.

To qualify, you should have knowledge of the computer market for business applications and/or of the software product market, particularly in the area of Programming Languages. You will need marketing and/or sales experience (NCR marketing experience is desirable) and a BS in Business Administration preferred.

We offer a competitive salary and benefits package and beautiful working environment, as well as the opportunity to enjoy year-round outdoor recreation in highly desirable San Diego. If you are ready for this kind of fast-paced career opportunity, send your resume to: **Personnel Resources, NCR Corporation, Dept. A55, Systems Engineering - Torrey Pines, 11010 Torreyana Road, San Diego, CA 92121.**

NCR

Complete Computer Systems

An equal opportunity employer

INSYSTEC

THE COMPANY

INSYSTEC is developing futuristic products with a high degree of software sophistication for the automated office. Insystec is headquartered in a modern facility in Winter Park, Florida, one of the nicest locations in Central Florida, just a few miles from downtown Orlando.

THE POSITIONS

We are presently experiencing rapid growth and have several positions available:

CHIEF SOFTWARE ARCHITECT - Candidate must have 10 years experience in software design, a thorough understanding of software techniques and concepts and experience in managing systems architecture professionals.

SOFTWARE MANAGERS - Candidates must have experience in operating systems and communications as well as a proven track record in managing software projects to rigid time schedules and budgets. Capable of organizing and managing systems designers, analysts, and programmers.

SOFTWARE ENGINEERS - Candidates must have 3 years experience in the development of systems software using modern techniques and assembly languages or "C" language background.

MARKETING PRODUCT MANAGERS - Candidates must have 3 years experience in hardware/software product development with a major office automation vendor, as well as experience in word processing, electronic mail, or personal computing.

If you are interested in discussing employment opportunities with INSYSTEC, please send a resume with salary history and position of interest to:

INSYSTEC, INC.
Personnel - Dept. CW
450 N. Lakemont Avenue
Winter Park, FL 32792

Equal Opportunity Employer M/F



UNITED AIRLINES ATTENTION PARS PROGRAMMERS ANNOUNCING:

- **IMPROVED SALARY PROGRAM**
- **NEW JOB PROGRESSION OPPORTUNITIES**
- **NEW PARS SOFTWARE EFFORT**

Exciting new plans for the expansion of our APOLLO reservations systems have created an immediate need for PARS software professionals at our Denver Computer Center.

Our progression opportunities, salary program and technical career ladder are among the best in the D.P. industry and the potential inherent in our plans for the future cannot be matched.

Investigate today! Several positions are available at various levels of expertise.

**PARS
EXPERIENCED
CANDIDATES
MAY CALL
COLLECT
303-779-2103**

No agencies please

Or send a resume in complete confidence to: **Professional Employment, United Airlines, P.O. Box 3194, Englewood, CO 80155.**

An Equal Opportunity Employer.

DENVER COMPUTER CENTER

THE PROJECTS:

New development efforts to enhance our existing IBM base with high level networking, interprocessor communications, applications, ACP systems and more.

THE ENVIRONMENT:

IBM 4341 and 9083 Processors, Amdahl V8, 3350 DASD Subsystems, CC85 (ALPS) Front Ends, and the world's most advanced telecommunications network.

THE POSITIONS:

PARS/ACP PROGRAMMERS

These positions require 2 or more years experience in a PARS/ACP environment plus a good working knowledge of IBM ASSEMBLER. Responsibilities include problem analysis, planning, programming specifications, coding and testing.

University of Iowa Academic Computing Center Director

The University of Iowa is seeking an individual to provide innovative leadership for a strong computing center which aids and promotes the use of computing by all segments of the academic community.

The Director is responsible for the management of a staff of 60 and computing equipment supporting 1400 terminals and for representing the academic computing center to faculty and professional groups. Qualifications for this position include a Ph.D. in a computer-related field or equivalent education plus experience and extensive technical and administrative experience in academic computing.

Send applications or nominations to:

**H. Bruce Friedrich, Chair
Computing Center Director
Search Committee
101 Jessup Hall
University of Iowa
Iowa City, IA 52242
EO/AA
Screening of Candidates
Will Begin October 10, 1983**

UNIX*/C

**\$25,000 to \$50,000
APPLICATIONS & SYSTEMS
Over 300 Openings Nationwide**

Client co's pay all fees
Call or send resume
in confidence to:

**J. ROGERS ASSOC
(609) 771-8282**

2999 Princeton Pike, Dept C-D
Lawrenceville, NJ 08648
UNIX is a trademark of Bell Labs

SYSTEMS PROGRAMMERS

The Central Intelligence Agency has several positions for experienced Computer Systems Programmers to work in a creative, complex, multi-system, laboratory-like, research oriented environment. The positions require the ability to install and maintain sophisticated systems and networks, perform configuration management, systems tuning, and performance analysis. Challenging assignments in the design and development of custom application and systems software are offered. These positions call for some domestic and foreign travel and a strong desire to maintain high levels of expertise in systems programming.

Applicants should have a degree in Computer Science, Mathematics, Engineering, or equivalent experience, and an in-depth knowledge of one or more of the following areas:

- IBM Operating Systems Internals (OS/MVS, JES2/JES3)
- VM/370 and CMS System Internals
- Computer Systems Measurement and Performance Enhancement
- Assembler Language Programming
- Minicomputer System Internals (DEC-VAX/VMS, UNIX)
- Systems Configuration and Selection

Salary range: \$25,000-\$50,000, depending on qualifications, plus all normal Federal employment benefits.
Location: McLean, Virginia.

U.S. Citizenship is required

Please send complete resume in confidence to:
Personnel Representative (MX), Dept. A, Room 821
P.O. Box 1925, Washington, D.C. 20013



An Equal Opportunity/Affirmative Action Employer

position announcements

position announcements

position announcements

position announcements

position announcements

DATA PROCESSING



SOHIO is combining talented and creative minds with advanced technology to further our aggressive oil and gas exploration and production efforts. In San Francisco, our Scientific Systems Division seeks the following scientific computing professionals to provide vital support to our Western Region activities.

CDC Operating System Specialists

Your expertise is needed to support the NOS version 2.1 operating system on Cyber 865 and Cyber 740 computers. In addition, you will provide networking support for 2551 network processing units. Successful individuals should have extensive experience with assembly language programming and operating system internals.

Networking Specialist

We are building an integrated network of distributed resources ranging from personal computers to vector super computers. This will include high performance local area network (hardware and software) and remote links to Cyber 205 and Cray super computers. Experience with hyperchannel hardware, CDC and DEC computers, and DECNET and high performance networking software is desired.

Workstation Specialist

In this position, you will support existing remote batch and PDP 11 workstations. Qualified candidates will have VAX VMS operating system experience in addition to distributed processing and communications concepts experience.

SOHIO's search for the best technical talent is an integral part of our expansion strategy. Our facilities include a new data center, enabling SOHIO to put the most advanced data processing technologies at your disposal. For immediate, confidential consideration for any of these opportunities, forward your resume with salary history today to Judy Alter, Sohio Petroleum Company, SO36, 50 Fremont Street, San Francisco, CA 94105. We are an equal opportunity employer M/F/H/V.

Your search
leads to Sohio.



California Federal, one of the nation's largest financial institutions, has immediate openings for high-caliber technical support personnel. Our systems include multiple Sperry 1100/80 and IBM 3083 computers, installed at our new Service Center in Rosemead, California.

Advanced Software Specialist (OS-1100) Provide operating system support to Sperry 1100/80 computers. Experienced in SYSGEN's TCF application, and panic dump analysis.

Advanced Software Specialist (CMS/TELECON) Provide TELECON support to five 95 Sperry DCP/40's, controlling 100+ branch network and 300+ in-house terminal system. Experienced in TELCON and CMS support.

Transaction Processing Group Leader Minimum of six years' maintaining or enhancing Sperry 1100 Control Software. Fluent in COBOL and 1100 Assembler. Minimum of two years' technical supervisory experience.

Data Base Group Leader Experience with hierarchical data base management systems in a large business environment. Minimum two years' technical supervisory experience required.

Senior Data Base Specialist (DMS-1100) Minimum of four years' experience using and maintaining DMS-1100. Experience with IBM data base products desirable.

Senior Systems Programmer (CICS) Three to five years' systems and programming experience in current CICS software products, such as CICIPARS, DLJ, MRO, ISC, PA II, OMEGAMON CICS. Experience in network products such as ACF/VTAM and ACF/NCP a plus.

Applications Support Analyst Provide technical support to applications programmer/analysts. Heavy COBOL experience in a transaction processing/data base management environment required. Responsible for second-level problem resolution.

Senior Programmer Analyst Responsible for host-to-teller machine interfaces. Minimum four years' COBOL programming experience. Knowledge of a major vendor's Assembler is desired.

Programmer/Analyst Responsible for host-to-teller machine interfaces. Minimum two years' COBOL programming experience.

Senior Hardware Specialist Assist the supervision of all installation and maintenance activities. Extensive knowledge of Sperry (1100 series) or IBM large-scale, multi-processor hardware configurations, lay-outs, and diagnostic techniques mandatory.

Senior Performance Analyst Experience with System Control Software on Sperry 1100 or IBM 3083 systems. Solid performance analysis experience which includes the use of system modeling.

Advanced Software Specialist (MAPPER) Provide MAPPER support, including MAPPER GENs. Plan, test, and implement new releases of MAPPER, and other system processors, as assigned. Knowledge of COBOL, SSG, and ASM required.

Manager, Network Department Responsible for the design and maintenance of a network supporting nearly 1,000 devices. A management track record, with a minimum of 6 years' experience in DP communications is mandatory.

If you are qualified and are interested in working in a dynamic and professional environment, we would like to talk to you.

Please submit your resume in confidence to
**California Federal Savings and Loan Association
Employment Department
1515 Walnut Grove
Rosemead, California 91770
CALIFORNIA FEDERAL**

Principals Only
Interviews by appointment only
Equal Opportunity Employer

Salt Lake City,
Utah

Norton Christensen MWD is a highly sophisticated Measurement While Drilling system used for drill face location in oil and gas drilling operations.

You will design, develop and test software at both module and systems levels. Qualifications are BS or equivalent in computer science, mathematics, electronic engineering or related field. Three to five years in Real-time microprocessor based systems design and development. Knowledge of 68000 assembly language and Pascal. Background in signal processing, digital filtering a plus.

We offer a stimulating work environment, excellent salary and a comprehensive benefit program, along with an ideal location where recreational activities are unlimited and the cultural and educational amenities are numerous.

Please send your resume with salary history to:

Linda Hansen
P.O. Box 26185
Salt Lake City, Utah 84126

SOFTWARE ENGINEER

NORTON

CHRISTENSEN
MEASUREMENT
WHILE DRILLING

Equal Opportunity Employer

CITIES SERVICE
OIL AND GAS CORPORATION

Software/Hardware Systems Analyst

Performance Tuning and Capacity Planning

Position requires over 4 years experience in systems programming in a large IBM mainframe (MVS, JES 3, TSO, IMS, CICS, and Communications Networking). Tools available include RMF, MICS, OMEGAMON, NPA, CAPTURE/MVS, BEST/1, SMF, SAS, ect.

IMS System Software Specialists (2)

Sysgens and Performance Responsibilities

Data Base Technical Support

Positions require over 4 years experience with IMS Data Base (at least one year with Sysgen or DBA responsibility). Prefer experience in large IBM, multi-CPU, OS-MVS shop.

Business Systems Programming Analysts

Systems Support and Development Positions

Requires over 2 years of COBOL programming in a CICS or IMS, TSO or CMS, OS JCL, large IBM environment.

Salaries competitive and commensurate with experience. Excellent oil industry benefits package. Cities Service is the domestic oil and gas subsidiary of Occidental Petroleum Corp. (a Fortune 50 Co.).

If you are interested in a challenging career with a large, state-of-the-art IBM systems group, send your complete resume of work history, education, technical skills, and salary requirements to:

Cities Service Oil and Gas Corporation
c/o G. R. Farley
Box 300
Tulsa, OK 74102

An Equal Opportunity Employer M/V

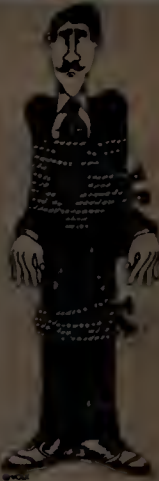
COMPUTER PROGRAMMING, SYSTEMS AND
ENGINEERING PROFESSIONALS

National employment resources at your service. Through our screened and selected employment affiliates, we'll get your resume to employers with applicable job openings in your targeted geographic areas. Openings for systems software and all kinds of applications programmers and analysts, EDP marketing and support reps, hardware and software engineers, EDP technical writers, etc. A quick and easy way to cover the job market. No fee, contract or obligation.

At least one year of professional experience required. U.S. citizens and permanent residents only. Send one resume along with current and desired salary, desired location and a summary of your computer hardware and software experience to

NATIONAL CONTACT NETWORK, INC.

Ref. CW, 3100 West Chapel Avenue
Cherry Hill, N.J. 08002 / (609) 667-4080



In a bind?

Do you
need real
professionals?

Advertise in
Computerworld
to find

exactly who
you're looking for.

Because...

More computer people
read Computerworld
than any other
newspaper in the
United States—more
than half a million

computer people every
week. And, among our
529,650 readers

at user organizations,
about half claim to
look at recruitment ads

at least every other
week (only a small
percentage say they

never look at
recruitment ads).

No wonder
Computerworld
carries more

recruitment ads for
computer people than
any other publication.

To place your ad
or

to get a rate

Call or write:

Classified

Advertising

Computerworld

Box 880

Framingham, MA

01701

(617)879-0700

(800)343-6474

position announcements	position announcements	position announcements	position announcements	position announcements
------------------------	------------------------	------------------------	------------------------	------------------------

CIBER

Consultants in Business/Engineering/Research

If your aim is a career predicated on delivering products of outstanding quality, on time and within budget, you should look into the advantages of a career with CIBER. CIBER provides a wide range of application development and conversion services for customers across the nation. For our employees, this means diversity and challenge. It could mean the same for you.

Currently, we have positions for those professionals who can work in a vertical capacity meaning analysis, programming, implementation, and documentation with emphasis toward IMS, IDMS, CICS, SYSTEM 2000, UFO, and PL/1.

Our salary structure is highly competitive, and is supplemented by a tax free income deferral program and an internal promotion policy based on achievements and results, not just seniority. You will also receive many fine benefits, including fully-paid family Medical, Dental, Disability and Life



Insurance, In-house Training, Tuition Refund, Relocation Assistance and more.

Call us collect or send your resume to:

Personnel Resources

CIBER

Parklane Towers West • Suite 1616
Dearborn, MI 48126

(313) 271-1221

Our Dearborn office processes all applications

Equal Opportunity Employer

GO WITH A LEADER

DATA PROCESSING PROFESSIONALS

Development and expansion have created openings in our Sperry 1100 shop which require 1100 experience in a medium to large installation. Knowledge of COBOL with a B.S. degree in Business Administration or Computer Science preferred.

SUPERVISORS

Data processing background with a minimum of two years of technical supervision is required. Applications exp. in material control, inventory, and/or commodities inventory/accounting desired. Must possess excellent communication skills.

SR. ANALYST PROGRAMMERS

4 to 6 years experience in production, financial, or marketing/distribution systems is required. Demonstrated project leadership and analysis skills preferred.

SYSTEMS PROGRAMMERS

3 to 5 years of system programming experience on a Univac 1100 system supporting a DCA/TELCON network are required for a position in our M.I.S. technical services department.

FOSTER FARMS is a progressive growth oriented Fortune 500 size company located in California San Joaquin Valley; engaged in breeding, producing, and distributing natural chicken and turkey products. Excellent benefits and competitive salary commensurate with ability. Please send resume and salary history to:



FOSTER FARMS

P.O. BOX 457
ATTN: BOX FIN
Livingston, CA 95334

Filing Deadline: October 3, 1983

Equal Opportunity Employer

How to Optimize Your Skills . . . and Maximize Your Success

Challenge: Optimize Your Skills through key opportunities in the most advanced technical environments. Projects utilizing your full range of skills, talents, and creativity.

Recognition: Maximize Your Success through recognition of superior performance. Visibility to top management that opens the door to career advancement opportunities.

Triple-I: Specialists in providing the professional challenge and personal recognition you need to assure career growth. Providing outstanding opportunities at the leading edge of technology.

The Triple-I elite team of computer professionals is made up of top performers with skills like COBOL, Assembler, IMS, MVS, CICS, VTAM, DB/DC, Tandem (TAL) and others.

To learn more about Triple-I, call toll-free

1-800-TRIPLE I, ext. 504

(In Missouri call 1-816-421-6969)

or send resume to:

Triple-I, Dept. S
1500 CharterBank Center
Kansas City, MO 64105



Programmer Analyst

Prepares programs. Analyzes business procedures and problems to refine data and convert it to programmable form for electronic data processing. Confers with personnel of organizational units involved to ascertain specific output requirements, such as types of breakouts, degree of data summarization, and format of management reports. Studies existing data handling systems to evaluate effectiveness and develops new systems to improve production or workflow as required. Will manage projects, assist in proposal preparation, perform feasibility and cost analysis. \$3,835/mo.; 40 hrs./wk. Requires B.A. in Data Processing or equivalent. Requires four years experience or four years experience as Systems Analyst. Experience with Programming Languages - COBOL, PL/1, and with Data Base Development Aids - IMS, DB/DC, MFS, BTS, and with Applications Development Aids - TSO/SPF, ADF. Must have experience developing international payrolls utilizing foreign currencies. Apply at the Texas Employment Commission, Houston, Texas, or send resume to the Texas Employment Commission, TEC Building, Austin, Texas, 78778, J.O. #3098323. Ad Paid by An Equal Employment Opportunity Employer.

Computer Systems Specialists

Challenging opportunities to join grad school-DOD teams in worldwide computer systems installation/application/extension training effort. Mobile state-of-the-art systems.

Priority Recruitment

- Systems Analysts/Programmers
- Honeywell Level 6
- Military Personnel Systems (SIDPERS)
- Engineering Facilities Management/Housing

- Industrial Engineers
- Financial Management Analysts

U.S. Citizenship Required

Send resume to:

Graduate School, USDA
Special Programs Room 108
600 Maryland Avenue, S.W.
Washington, D.C. 20024

Attn: Leonard B. Pouliot or Fran Richmann

Florida Programmer/Analyst

Prestigious bank in Palm Beach requires a qualified individual to perform program maintenance, debug research program problems, technical documentation, and data collection for program specification. Minimum 3 years experience in DOS VFE-4341, ICCF, COBOL, and CICS Command Level. Knowledge of BAL, CMS and Florida banking software applications helpful. Excellent benefits and growth opportunity. Send confidential resume and salary history to:

Personnel Department
First National Bank in Palm Beach
255 South County Road
Palm Beach, Florida 33480
EOE M/F/V/H

PROGRAMMERS

HOGAN SOFTWARE

equals

\$\$\$\$\$

In New York City

Please call at once:

(212) 239-4750

or send resumes to:

Ray Sheerin

VSI

VECTRON SYSTEMS, INC.

1 Penn Plaza, Room 1429

New York, N.Y. 10119

equal opportunity employer m/f

SAUDI ARABIA DATA PROCESSING CAREER OPPORTUNITIES

THE MINISTRY OF PLANNING of the Kingdom of Saudi Arabia is responsible for the preparation of the National 5-Year Development Plans and the monitoring of their implementation. The mandate of the Computer Department in this major ministry is to support these activities through the design and development of planning and follow-up information systems, the maintenance of statistical data bases, and the use of various modelling tools. A number of immediate opportunities are available for data processing professionals in the following areas:

MANAGER, SYSTEMS DEVELOPMENT AND MAINTENANCE

To plan, supervise and participate in all systems development efforts in the ministry, from functional specifications through the operational phase. Requires extensive experience with IBM Mainframes (8 years minimum), Data Base (Adabas/Natural), Structured Techniques, and On-Line Systems. Candidates should hold an advanced degree in Computer Science/Information System, have at least 3 years of supervisory experience and the ability to liaison well with management, users and staff.

DATA BASE ADMINISTRATOR

BS in Computer Science required. Must have 5-8 years experience in Data Processing and a proven track record in Business Applications Development, with at least 3 years as a data base administrator in Adabas/Natural Environments. Expertise in Cobol and/or PL/1. OS/VSI or higher level experience. Must be able to liaison well with management, staff and users.

SYSTEMS ANALYSTS

BS/BA required. Must have 4-6 years experience in Data Processing and a proven track record in all of the following areas: requirement analysis for major business applications, project responsibilities and users, Cobol and/or PL/1 expertise, OS/VSI or higher level experience, data base knowledge. Understanding of S/W development methodologies is preferred. Modelling experience is a definite plus.

PROGRAMMER/ANALYSTS

BS/BA required. Must have 3-5 years experience in the design, coding, and maintenance of business applications programming on IBM Mainframes. Good knowledge of Cobol and/or PL/1 essential. Experience with Fortran and Natural is definitely a plus.

SYSTEMS PROGRAMMERS

BS in Computer Science required. 3-5 years experience in VM/370, OS/VSI or higher level environment. Installation of various program products, O/S and I/O generation and maintenance. Must be a good assembler programmer. A senior position is available for professionals with 5-8 years experience in MVS. Installation of PTF and new releases of MVS using SMP. Good knowledge of MVS control flow and control blocks. Must be an excellent assembler programmer. Degree and supervisory experience required. O/S conversion experience and capacity analysis are preferred.

HARDWARE TECHNICIAN

BS or diploma in Electronics required. 3-5 years experience in IBM I/O devices installation, equipment trouble-shooting and repair.

OPERATORS

Formal training required. Must have 3-5 years experience in Task/Program scheduling, computer/peripheral operation on IBM MainFrames, and complete understanding of documentation, systems, JCL, hardware configuration, operating system (OS/VSI or higher) and utility software as they relate to operations. A senior position is available for operators with associate degrees, 5-8 years experience as described above, and 2 years supervisory experience. Experience with 3rd world nationals is preferred. Preference will be given to persons bilingual in Arabic and English and to those with prior Middle East experience.

All the positions are offered on a 2-year contract basis. Benefits include: medical, free furnished accommodation/lodging allowance, education allowance, transportation and maintenance allowance, 45 days annual leave, all official holidays, and annual return home travel. Applicants should immediately send resume including telephone number, references' telephone numbers, recent passport-size picture, salary history, and indicating position of interest to:

SAUDI RECRUITMENT OFFICE
1101 VERMONT AVENUE NW, SUITE 501
WASHINGTON, DC 20005 USA
Telephone Number (202) 682-0444, 45, 56, 47

RESUME SHOULD BE SUBMITTED BY OCTOBER 10, 1983.

SALES

Major computer disk manufacturer seeks professional sales person to call on software publishers in S. Cal., Ariz. and Nevada. Excellent salary and commission, car allowance and normal business expenses. Prefer 2 years or more calling on software publishers and duplicators. No phone calls please. Send resume to: S. Holmgren.

ATHANA

Athana Incorporated
2730 Monterey Street
Torrance Ca. 90503

position announcements	position announcements	position announcements	position announcements	position announcements
------------------------	------------------------	------------------------	------------------------	------------------------

FIELD ENGINEERS

Dataserv Computer Maintenance is expanding nationwide. We now have immediate openings in major cities and will be adding more in the near future.

These are key positions and provide excellent opportunities that will lead to further promotion in a fast growing company. Excellent compensation plan and good fringe benefits for experienced individuals. Your potential for personal advancement with a \$100 million plus company is the greatest right now as we expand.

We now have immediate openings in these cities for these positions:

Washington D.C. — FIELD ENGINEERS
We need experienced F/E to maintain IBM 327X display equipment.

Milwaukee, Wisconsin — FIELD ENGINEERS
Immediate opening for engineer with experience on IBM tapes, printers, disks, display equipment.

Dallas, Texas — FIELD ENGINEERS
Excellent position for experienced Field Engineer to work on IBM 327X equipment. We have several openings in the Dallas, Ft. Worth metro area.

Los Angeles, California — FIELD ENGINEERS
Field Engineers required for the support of IBM 3600 Banking and/or Supermarket Systems.

Dataserv will soon have additional opportunities for field engineers and technical specialists in several other major cities throughout the United States. If you are considering a change in employment, contact Dataserv for a review of what we have to offer.

For immediate consideration and more information call Toll Free — 800-328-6729 or send your resume to: **Bev Walters, Dataserv Computer Maintenance, Inc., P.O. Box 3003, Hopkins, MN 55343.** We are an equal opportunity employer and all inquiries are considered confidential.

dataserv

INFORMATION SYSTEMS ADMINISTRATIVE DATA PROCESSING LOS ALAMOS NATIONAL LABORATORY

The Los Alamos National Laboratory, a multifaceted research and development facility operated by the University of California for the Department of Energy, has several positions available for Senior Programmer/Staff Member. These positions require extensive experience in developing financial, personnel, and/or materials management COBOL software systems.

Duties and responsibilities include the design, implementation, and maintenance of administrative data processing systems in a structured environment. The development of on-line applications using COBOL operating under CDC, NOS, or VAX VMS, will be oriented toward the administrative end-user.

These positions require extensive professional level experience in data base management for ADP Information Systems. A Bachelors degree or equivalent in Business Administration or Computer Science is required. An M.B.A. is desirable.

The laboratory is located in the mountains of north-central New Mexico. The area offers excellent recreational opportunities that includes hiking, camping, fishing, skiing, tennis and hunting. The Laboratory provides an impressive benefits package including 24 days annual vacation and 11 paid holidays.

To apply, please send resume in confidence to:

Elmer H. Salazar
Associate Group Leader, ADTS/ADC
Los Alamos National Laboratory, DIV 83-Y
Los Alamos, New Mexico 87545

University of California

Los Alamos

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

An Affirmative Action/Equal Employer: Women,
Minorities, Handicapped and Veterans are urged to apply.

DIRECTOR OF MANAGEMENT INFORMATION SYSTEMS FAIRBANKS MEMORIAL HOSPITAL

FAIRBANKS MEMORIAL HOSPITAL (FMH) is a 200-bed full-service institution located in Fairbanks, Alaska. FMH is a member of the Lutheran Hospitals and Homes Society of America, Inc. (LHHS), which is a multi-institutional organization operating 73 institutions in 13 states. FMH, in concert with LHHS, has recently completed a major planning process to significantly increase its' data processing capabilities and is seeking an experienced data processing professional to assist in the execution of this plan and fill the position of Director of Management Information Systems.

THE DIRECTOR will be expected to work with FMH and LHHS home office staff in expanding the data processing capabilities at FMH. The Director will be responsible for the general management and administration for all current data processing activities, including FMH data center operations, liaison with LHHS data center operations, and assisting FMH staff in defining and satisfying data processing needs. In addition, the Director will participate in the formulation of data processing policy, review and update the long-range data processing plan, and assess new hardware and software technology relative to FMH needs.

THE IDEAL CANDIDATE will have a Bachelor's Degree; 4 years of experience in a hospital data processing environment with demonstrated career advancement toward increasing management responsibility; and an excellent knowledge of the various system applications which comprise a hospital management information system. Advanced degree and additional experience in system acquisition/development are desirable.

We offer an excellent compensation package and complete benefits, including medical/dental/vision insurance, 3 weeks vacation, pension plan, and the unparalleled outdoor activities of interior Alaska. For immediate consideration, please send your resume to:

**Mr. Tom Mingen, Administrator
FAIRBANKS MEMORIAL HOSPITAL
c/o 600 108th Ave., NE
Ste. 901
Bellevue, WA 98004
An equal opportunity employer**



Information Systems Professionals

Del Monte Corporation, an affiliate of R.J. Reynolds Industries, Inc., is one of the world's largest food and beverage companies.

Opportunities currently exist in our IBM 3083 MVS environment for experienced Programmer Analysts able to assume immediate responsibility in a variety of applications.

Candidates should have strong communication skills and at least two years' ANS, COBOL programming and systems development experience. Exposure to TOTAL DBMS, WYLBUR, and MARK IV desired.

We offer an excellent compensation and benefit package and a prime San Francisco location.

For immediate consideration, send resume in confidence to **Wilzetta Hall-Roberts, Del Monte Corporation, Box 3575, San Francisco, CA 94119.**

An EOE/MFH



TECHNICAL ANALYSTS

Philip Morris U.S.A. is a leader in its industry, and houses one of the most sophisticated MIS centers in the country. Our equipment exists with IBM large scale processor utilizing MVS, IMS, TSO/SPF and VM to drive a large SNA network.

Current opportunities exist for Technical Analysts with a minimum of 4 years experience in one or more of the following areas:

• VM • MVS • Network Communications

When you join Philip Morris U.S.A. you will be joining a growth company. Our starting salaries and benefits are among the best and our career opportunities are hard to beat.

Send resume to: **J. Hardin, Dept. #118-83, Philip Morris U.S.A., P.O. Box 26603, Richmond, VA 23261.**

Employing equally today... Promoting equally tomorrow.

Philip Morris U.S.A.

We'll
keep
you
up to
date

week,
after
week,

after
week,

after
week,

after
week,

after
week,

position announcements

position announcements

position announcements

position announcements

position announcements

APPLIED MAGNETICS
LOCATED NEXT TO BEAUTIFUL
SANTA BARBARA, CALIFORNIA

Due to our steady rapid expansion and the introduction of new products, Applied Magnetics, the world's leading independent manufacturer of magnetic recording heads, has the following professional positions available:

SYSTEMS PROGRAMMER

Must have 2 or more years of ALC, VSAM and CICS. Prefer additional experience in COBOL, DOS/VSE and VM/CMS.

SENIOR CAM SOFTWARE
DEVELOPMENT ENGINEER

Develop software for sophisticated data base management - computer aided manufacturing system. Would like Senior Software applicant with 5-8 years related experience (HP1000-3000 series), and a good working knowledge of PASCAL and DB system. Background in a manufacturing environment/factory automation would be a definite plus.

If you are qualified for one of the above positions, or have Magnetic Recording Head experience and are interested in joining a dynamic organization which ideally combines the friendliness of a smaller company with the advanced technology of a large company, please send your resume to, or call:

Michael F. Easley
Professional Recruiting Manager
(805) 964-4881

Applied Magnetics

75 Robin Hill Road
Goleta, CA 93117

An Equal Opportunity Employer M/F

The Optical Disk Division of Storage Technology is involved in the design, development and manufacture of Optical Data Recording products. Located in Longmont, Colorado, there is a current need for the following professional:

SENIOR MVS SOFTWARE
TECHNICAL WRITER

You will research and write software product specification and technical manuals for a new product development. Requires BS CS/Journalism or related field with relevant experience in Software including a working knowledge of MVS. Minimum of 6 years experience in technical writing or 2 years writing and 4 years Software engineering experience.

STORAGE TECHNOLOGY offers an excellent benefits package which includes health, dental and life insurance, stock purchase plan and much more. For immediate consideration, please call Dan O'Reilly at 678-3034 or send your resume to his attention at Storage Technology Corporation, MD FF, Dept. 918, #16, 2270 South 88th Street, Louisville, Colorado 80028. Equal Opportunity Employer.

Storage Technology

EMPLOYMENT SERVICE FOR
PROGRAMMERS AND ANALYSTS

National Openings With Client Companies
and Through Affiliated Agencies

Scientific and commercial applications • Software development and systems programming • Telecommunications • Control systems • Computer engineering • Computer marketing and support

Call or send resume or rough notes of objectives, salary location restrictions education and experience (including computers, models operating systems and languages) to either one of our locations. Our client companies pay all of our fees. We guide, you decide.

RSVP SERVICES, Dept. C
Suite 700, One Cherry Hill Mall
Cherry Hill, New Jersey 08002
(609) 667-4488

RSVP SERVICES, Dept. C
Suite 211, Dublin Hall
1777 Walton Rd., Blue Bell, PA 19422
(215) 629-0595

From outside New Jersey, call toll-free 800-222-0153

RSVP SERVICES

Employment Agents for Computer Professionals

NEW START-UP
OPPORTUNITIES

Fox-Morris specializes in the placement of all programmers and systems analysts. Our present openings are with Top Fortune 500 companies with special emphasis on NEW START-UP opportunities on a local and regional basis. For a clear understanding of our client's needs and to know your true value in today's market, call Robert Montgomery at 919/872-2940 or send resume to

FOX-MORRIS

Personnel Consultants
Since 1962
3101 Poplarwood Court
Raleigh, NC 27625

CALIFORNIA - UNIX*

- Port to parallel processor
- User friendly interface
- System V and BSD 4.2
- M68000 Port also

Agency inquiries invited.
CALL (714) 891-UNIX*

CPU COMPUTER
PROFESSIONALS
UNLIMITED, agency
7441 Garden Grove Blvd.
Ste. G, Garden Grove, CA 92641
**UNIX is a trademark of Bell Laboratories*

IMS
SPECIALIST

Dynamic Fortune 500 consumer svcs. org. seeks motivated COBOL/IMS P/A for new apps. devel. proj. Well managed IBM OS/MVS IMS DB/DC COBOL shop with extensive on-line network. Outstanding career advancement oppty. \$35,000.

Robert Half of Boston, Inc.
100 Summer Street
Boston, MA 02110
(617) 423-1200
Personnel Consultants

GATEWAY TO THE WEST
- THE GREAT PLAINS
SYSTEMS ANALYSTS

(17 Needed)

2 - 5 years large frame IBM environment insurance or financial applications. Our client is one of the world's largest life insurance companies located in a mid-size metro area. If you want freedom to develop your style, you need to look at this. In confidence send your resume and salary history or call: **JOAN OR CHUCK DUMMER**

Dunhill

of KEARNEY, INC.
3720 Ave. A Suite B
Kearney, NE 68647
(Call Collect) (308) 234-4555

IBM
(Charlotte)
SYSTEMS PROGRAMMER

Our client, IBM, requires 2 systems programmers. One should have 4 years experience in software support: IBM 370, OS/MVS/JES3. The other should have 3 years experience in micro-coding, assembler language.

Rick Young
Corporate Personnel
3705 - 310 Latrobe Drive
Charlotte, N.C. 28211

Computer Information Systems--
Tenure Track beginning Jan. '84;
Coordinate implementation of new
major. Experience/concentration
for teaching in Management Information Systems, Data Base Systems, or Systems Analysis and Design. Ph.D. or advanced ABD in Computer Science necessary.
Rank and salary negotiable. Send letter and vita to
Dr. Stephen A. Hirsch, CIS
Search Committee, College of Saint Rose, Albany, New York 12203

Data Processing

Software
Design
Engineer
Design and
Development for Real
Time Systems



Vitro Laboratories has been revolutionizing standards in systems design, analysis, and computer program development for more than thirty years.

Vitro's continuing expansion has opened up new career opportunities for key program designers who will participate in the development of computer programs for U.S. Navy and Coast Guard systems.

For consideration, you should have at least seven years of experience, with a degree in either computer science, mathematics, physics or electrical engineering; although related experience may be considered in lieu of a degree.

- Top-Down structured computer programming techniques for real-time application
- Utilization of large scale main-frame computers via TSO/WYLBUR for computer programming development
- Computer program development for militarized computers
- Executive control system design and implementation
- I/O routine design and implementation
- Software structure development and functional allocation
- Computer program performance specification development
- Computer design specification development
- Computer program description documentation development
- Computer program debug, test and verification
- SOFTWARE: CMS-2 compiler, CMS-2Y compiler, CMS-2M compiler, Assembly languages, ULTRA 16, ULTRA 32, TRIM III ADA
- HARDWARE: AN-UYK 20, AN-UYK 7, AN-UYK 43, AN-UYK 44, UNIVAC 1219

Vitro offers a professional environment with outstanding incentive for productive people, access to extensive technical resources, and the opportunity to participate in vital, state-of-the-art defense projects. Vitro is conveniently located in the northern Maryland suburbs of Washington, D.C., only minutes by car from the Nation's capital and its permanent cultural assets. Interested candidates are invited to contact Debbie Wetzel, Staffing Representative, toll-free, at (800) 638-2901, ext. 3625; or call (301) 871-3625, collect. If unable to call, please forward your statement of qualifications and salary requirements to:

Vitro
CORPORATION

DEPARTMENT CW 536
14000 GEORGIA AVENUE
SILVER SPRING, MARYLAND 20910
AN EQUAL OPPORTUNITY EMPLOYER M/F/H
U.S. CITIZENSHIP REQUIRED

COMPUTER SCIENTISTS
Center for Programming Science and Technology
of the

INSTITUTE FOR COMPUTER SCIENCES AND TECHNOLOGY

Challenging opportunities to perform research, provide technical assistance in the use of new technology, and to develop technical standards and guidelines. Laboratory based environment with advanced facilities that include VAX's, other UNIX based systems, data base machines, and personnel computers such as IBM and Apple Lisa.

- Technical areas for which staff is currently needed include:
- Data Base Management Technology--Data Base Management Systems, Data Base Machines, Distributed Data Base Technology, and Data Administration.
 - Application Development Technology--Very High Level Languages, Program Generators, Advanced Software Development Environments.
 - Knowledge-Based Systems--Expert Assistance System Technology, Application to Software Development.
 - Computer Security and Risk Management.
 - System Architecture--Microcomputer Software Technology, Micro-Mainframe Link, Distributed Systems.

Graduate degree in computer science or mathematics or equivalent experience with demonstrated ability to conduct research is required. Recent experience commensurate with Civil Service grade level in the area or areas of specialization is required. These positions range from GS-09 to GS-14 (\$22,956 to \$53,661) depending upon qualifications and experience, and offer competitive salary, excellent career benefits, and other professional growth opportunities. Please send your Personal Qualifications Statement (SF-171) to:

U.S. Department of Commerce
National Bureau of Standards
Administration Building, Room A123
Washington, D.C. 20234
Attn: Mrs. Ruth Bussle (840-CW)

The National Bureau of Standards is located in modern facilities in Gaithersburg, Maryland and is an Equal Opportunity/Affirmative Action Employer. U.S. citizenship is required.

position announcements

position announcements

position announcements

position announcements

position announcements

DATA PROCESSING EXECUTIVES

If Your Potential
Matches Our Growth...



Choose a career to open new paths to success. Systems & Computer Technology Corporation (SCT) has multiple management openings available at our corporate headquarters and client sites throughout the nation.

We're recognized as the pioneering leader in providing the full range of services in Software/Systems Development and Computing Resource Management to a growing list of more than 300 clients within the higher education and local government marketplaces. This spread of clientele, and the many unique projects they engender, offer unlimited opportunities for total involvement and high level responsibility in technical and managerial applications. We seek experienced:

- MARKETING DIRECTORS
- SOFTWARE DEVELOPMENT DIRECTORS
- SITE MANAGERS

Make the choice with the challenges and rewards of high level D.P. consulting. We offer a long term career to match your skills, knowledge and lifestyle. Please direct your resume, indicating areas of interest, to: **Manager, Corporate Recruiting, SCT, Dept. CW-15, Great Valley Corporate Center, 4 Country View Road, Malvern, PA 19355.** An Equal Opportunity Employer, M/F.

SYSTEMS & COMPUTER
TECHNOLOGY CORPORATION

On The Grow



Engineers and
Software Programmers

Growth at BNR INC., in Ann Arbor, Michigan, has created exceptional opportunities for ambitious professionals. We need talented engineers and programmers to participate in the development of advanced data processing systems and their integration with telecommunications networks. The following positions are available immediately:

Senior Software Programmer

Programmer with 3-5 years of experience for leadership role in data communications development. Experience in communications protocols is required, familiarity with IBM 3270 or SNA implementation is desirable.

Quality Assurance Specialist

Experienced software programmer/analyst in the area of systems integration and quality assurance testing. Experience in data communications, 3270, SNA or LAN is desirable. Module and system level testing of software for data communication/3270 type products. Some test tools development programming is required.

Senior Design Engineer - Mechanical

Self motivated, aggressive individual with a BSME and 3-5 years experience in computer mechanism and packaging design. Knowledge of electromechanics, optics, metallurgy, and chemical properties of plastics/materials is desirable. Must be able to do detail drawings. Applicant will have the opportunity of designing for next generation product development.

We offer excellent compensation and one of the best benefit programs in the industry. For immediate consideration, please send your resume with salary history to: BNR INC., 100 Phoenix Drive, Ann Arbor, MI 48106, (313) 973-4700.



BNR
Subsidiary of
Bell-Northern Research

The R & D Laboratory for
Northern Telecom and Bell Canada
Equal Opportunity Employer

Scientific
Programming
Opportunities

Leading pharmaceutical company has
two challenging positions available:

SCIENTIFIC
PROGRAMMER I

Project Leader

Position is located in beautiful SUSSEX COUNTY, NEW JERSEY. We require a BS/MS in Computer Science or related discipline and minimum 5 years programming experience. Knowledge of SAS and MVS/TSO operating system is essential.

SCIENTIFIC
PROGRAMMER II

This position is located in BLOOMFIELD, NEW JERSEY and requires a BS/MS in Computer Science, Math or Life Sciences with minimum 2 years programming experience. Knowledge of SAS, INQUIRE and MVS/TSO operating system required.

If interested, please send resume in writing, indicating position desired, to: Box CPIB, Schering-Plough Corporation, 60 Orange Street, Bloomfield, New Jersey 07003.



Schering-Plough

We Are An Equal Opportunity Employer M/F

PROGRAMMER/
ANALYSTS

We Can Take Your Career
A Long Way In The Next
Two Years!

Come to ANATEC with two or more years' experience and the next two years will provide you with outstanding opportunities for challenging, diverse assignments with our Fortune 500 clients.

We're seeking computer professionals with 2-10 years' experience with IMS DB/DC and/or CICS on Large Scale IBM Mainframes. TANDEM COBOL and Information Center Specialist opportunities are also available. Independent contractors are welcomed.

The rewards? To begin with, we'll provide you with a top salary and generous benefits that include paid travel, overtime pay and tuition reimbursement. Then see how much you can achieve with ANATEC in the next two years...five years...and beyond.

Find out more by writing us in confidence or calling collect: (313) 540-4440, ANATEC, Analytical Technologies, Inc., 30300 Telegraph Rd., Suite 184, Birmingham, MI 48010.

We are an Equal Opportunity Employer
No agencies please



Analytical Technologies, Inc.
Succeeding With Imagination

COMPUTER NETWORK PROTOCOLS

COMPUTER SCIENTIST needed to:

- perform laboratory studies of high-level network protocols (terrestrial and satellite networks), computer-based office systems protocols, and local area network protocols (CSMA and token access methods),
- perform advanced research in computer network technology including advanced network architecture design, network operating systems, and protocol design techniques,
- participate in national and international technical committees to develop networking standards, and
- design protocols using finite state machine methods.

Desirable experiences include protocol design, implementation and testing, and understanding of operating system principles, use of high-level programming languages, and work with technical committees. An undergraduate degree which consisted of 30 semester hours in mathematics, statistics and computer science and included differential and integral calculus courses is required in addition to at least three (3) years of experience in the computer science field.

For the research position, desirable experience also includes research in advanced development of network architecture, data communications technology, and protocol design. A Ph.D. in computer science or a related field or equivalent is preferred.

These positions range from GS-12 to GS-15 grade levels depending upon qualifications and experience and offer competitive salary, excellent career benefits and professional growth opportunities. Please send your Personal Qualifications Statement (SF-171) to:

U.S. Department of Commerce
National Bureau of Standards
Administration Building, Room A123
Washington, D.C. 20234
Attn: Mrs. Ruth Bussie (650-CW)

The National Bureau of Standards is located in modern facilities in Gaithersburg, Maryland, and is an Equal Employment/Affirmative Action Employer. U.S. citizenship is required.

CURIOUS
ABOUT
CLASSIFIED?



If you are interested in advertising with **Computerworld**, but don't know how to do it, give us a call! We will be glad to send you our current rate card, which explains sizes, costs, deadlines and requirements. Along with that, we can send a demo paper which actually shows examples of ad sizes, type-faces, and prices. All you have to do is ask! Our toll free number is 800-343-6474, in Massachusetts call (617)879-0700, just ask for the **Classified Advertising Department**. Or, you can look for our classified order form located in the classified section of **Computerworld**. Fill it out, attach your ad with a check, and return it to us. **Computerworld Classified Advertising**, 375 Cochituate Rd., Box 880, Framingham, MA 01701. We're anxious to help!

BUY•SELL•SWAP

THE HARDWAREHOUSE IS HARD TO BEAT FOR PRICE AND AVAILABILITY.



**CALL US TODAY AT (602) 248-6848, PHOENIX, ARIZONA
OR CALL OUR LOCAL OFFICE IN YOUR AREA**

Boston: Eastern Regional Headquarters (617) 272-8110
 Virginia.....(703) 525-5233
 New York.....(212) 832-2622
 Washington/Baltimore.....(202) 463-7857

Chicago: Central Regional Headquarters (312) 789-9100
 Pittsburgh.....(412) 922-8920
 Detroit.....(313) 995-8717

San Francisco: Western Regional Headquarters (415) 283-8980
 Los Angeles.....(213) 670-7994
 Denver.....(303) 534-7436
 San Diego.....(619) 231-2361
 Seattle.....(206) 447-1682
 Phoenix.....(602) 248-5978
 Portland.....(503) 228-7033
 Salt Lake City.....(801) 298-4281

Austin: Southern Regional Headquarters (512) 451-0121
 Atlanta.....(404) 768-6535
 Dallas.....(214) 233-1818
 Houston.....(713) 629-4440

Canada: Toronto (416) 366-1513
 Montreal.....(514) 281-1925



GREYHOUND COMPUTER CORPORATION

SUBSIDIARY OF THE GREYHOUND CORPORATION
800-528-6113

SYSTEMS
4341 4331

38 34

36

32 3

BUY • SELL • LEASE

COMPUTER
BROKERS, INC.
2978 SHELBY ST.
MEMPHIS, TENNESSEE



TOLL-FREE
800-238-6405
901-372-2622

PERIPHERALS

3203 3370

3340 3411

3350 3420



Attention!

IBM

SERIES/1

5/34

5/38

5/10-5/120

5/33

SYSTEM/36

EARLY DELIVERY
ONLY LEASE RATES

BUY
SELL
LEASE

ALL MODELS
SYSTEMS AND
PERIPHERALS

AVAILABLE NOW!

CALL
(408) 425-7333

SOURCE

IBM, PHOENIX, AZ

IBM, PHOENIX, AZ

buy	sell	swap	buy	sell	swap	buy	sell	swap	buy	sell	swap	buy	sell	swap
-----	------	------	-----	------	------	-----	------	------	-----	------	------	-----	------	------



One-stop computer leasing.

The Total Computer Company...

- Flexible lease terms.
- Purchase lease-backs.
- Equipment for sale.
- Maintenance service contracts.
- Substantial inventory available.
- Refurbishing & reconfiguration by our own staff.
- Data center relocations & installations.
- Custom software design.

Available Immediately...

IBM Mainframes			
4341	4331	3033	3031
IBM Peripherals			
3350	3420	3525	3287
3375	3203	3178	3704
3380	3211	3278	3705
3880	3811	3274	
3803	3505	3276	

Hartford Computer Group

A Subsidiary of Hartford Financial Corporation
515 East Golf Road, Arlington Heights, IL 60005



800-323-6355

or 312-364-0505

LEASE ONLY

2501-B2

Available Immediately

METROPLEX COMPUTER COMPANY, INC.
320 Decker Drive • Suite 180
Irving, TX 75062
(214) 258-0541
TWX 910 860 9285

Upgrading? MEMORY IBM & OEM

158, 168, 3031, 3033

Call:

Rohn or Bob Miller
(612) 884-3366

Centron-DPL Company

PRIME COMPUTER USERS

New 80 and 300 megabyte drives
Available for immediate delivery.
300/1440 LPM Printers
also available.
Nationwide CDC maintenance
and financing.

Call Barry Dacks
Timesharing Services Inc.
(904)398-7068

FOR SALE OR LEASE

System/38 Model 581

3370-A11

Immediate Delivery

TexCom Management
Services, Inc.

4403 N. W. Loop 410
San Antonio, Texas 78229
512-349-9955

Computerworld CLASSIFIEDS

Our business
is to help you
improve yours—

via programmers,
analysts, engineers,
terminals, printers,
software packages,
computer time,
computer services,
office space,
advertising for
seminars &
conferences, business
opportunities, AND...

exposure to an
audience of
over half a million
readers
NATIONWIDE...

...EVERY WEEK.

BROOKVALE
RENT • SELL • UPGRADE • BUY

DEC

PDP 8, 11/03, 11/04, 11/23, 11/24, 11/34,
11/44, 11/45, 11/60, 11/70, VAX/750, VAX/780

SYSTEMS • OPTIONS • SUPPLIES

11/70	512Kb MOS, LA36 (used) *new also available	\$48,500
11/34A	128Kb MOS, Dual RL02's, cabinet (new)	\$13,495
11/23	128Kb MOS, Dual RL02, CAB, VT 102 (new)	\$14,850

Customized Configurations-Call With Your Request.

In Stock	Specials	In Stock
11/04-DC (unused).....\$2,850	H9642 (new).....\$1,350	
DB11-A (unused).....\$ 495	LP11-WA (unused).....\$3,495	
DD11-DK (new).....\$ 650	MS750-CA (new).....\$4,195	
DL11-E (used).....\$ 375	MS750-DC (new).....\$8,950	
DMF32-AB (new).....\$3,495	RH780 (used).....\$3,850	
DU11-DA (used).....\$ 795	RL02K-DC (new).....\$ 165	
DZ11-E (new).....\$3,595	RUA80-AA (new).....Call	
FP750-AA (new).....\$5,970	VT102-AA (new).....\$1,395	

BROOKVALE ASSOCIATES

40 ORVILLE DRIVE • BOHEMIA NEW YORK 11716

(800) 645-1167 • NEW YORK (516) 567-7777

IBM CPU's

3081 3083

3033

4331 4341

sys 38

Call Dataserv Toll-Free when buying,
selling or leasing CPU's or Peripherals
Our numbers speak louder than words

dataserv

509 SECOND AVE SO HOPKINS MN 55343 INTERNATIONAL HEADQUARTERS

TOLL-FREE 800/328-6729 IN MINNESOTA CALL COLLECT 612 933-2575

buy

sell

swap

buy

sell

swap

buy

sell

swap

buy

sell

swap

buy

sell

swap



214/385-0354

BUY-SELL LEASE

- All IBM Systems
- Peripherals
- Tapes
- Disks

SERIES/1

- Systems
- Features
- Peripherals
- New systems available at substantial discounts

IBM P.C.

- Lease program for IBM personal computers

PIONEER COMPUTER MARKETING

4835 LBJ Frwy, Suite 680
Dallas, Texas 75234
214/385-0354

IBM

SYSTEM/34

S/3 • S/32 • S/38
5291 • 5251
3741 • 3742

BUY • SELL • LEASE
REFURBISHED • RECONFIGURATED
SHORT-TERM LEASES
PURCHASE/LEASEBACK



Tennecom
MARKETING INCORPORATED

210 SPACE PARK NORTH
P.O. BOX 248
WOODLETTSVILLE (NASHVILLE)
TENNESSEE 37072

800-422-1004
IN TENNESSEE CALL: (615) 859-3872

NEW

USED

UNBEATABLE PRICES

T.I. Specialists*



ADDS
DEC
DIABLO
HAZELTINE
QUME
TELEVIDEO
TEXAS INSTRUMENTS

TO 50% DISCOUNT

THE COMPUTER BANK
315 Rte. 110, Hunt. Sta., New York 11746
(516) 549-5500

* Printers, Systems, Terminals, VDT's



Your First Choice ☒ In The Second Market

IBM PROCESSORS

☐ **308X** 36-60 Month Leases (ITC Lessor or Lessee)

☐ **3033** Available for lease or sale now

☐ **3032** Available for short term lease

☐ **3031** Available for lease or sale now (along with A/P's)

☐ **4341** We're Buyers, Sellers and Lessors of Group I's and II's

☐ **4331** Group II's available for lease or sale

☐ **Memory/Channels** available for 303X, 4300 and all 370's

IBM PERIPHERALS

☐ **3880/3830** Immediate Availability

☐ **3380/3375** Immediate Availability

☐ **3350/3370** Immediate Availability

☐ **3803/3420** Immediate Availability (All models)

☐ **3800 3704/3705** 30-day Availability

☐ **3811/3211** Immediate Availability

☐ **327X** We're Buyers, Sellers and Lessors

We Can Put It Together

Eastern Regional Headquarters
(Connecticut) 203 655-1211
New Jersey 201 568-9666
Washington D.C. 301 441-1000
Philadelphia PA 215 545-8035
Boston, MA 617 542 4005

Midwestern Regional Headquarters
(Chicago) 312 698-3000
Michigan 313 644-1500

Western Regional Headquarters
(San Francisco) 415/944-1111

South Central Regional Headquarters
(Dallas) 214 641-3255
Atlanta 404 256-5956
Florida 305 428-3177

Canadian Regional Headquarters
(Toronto) 416 968-7135

International Headquarters
(Chicago) 312 698-3000
Latin America 305 666-6258
Paris 01 524 5270
Switzerland 41 (21)71 09 35
West Germany (2434) 5048

Corporate Headquarters
6400 Shafer Court 312 698-3000
Rosemont IL 60018 TWX 910-253 1233



A MEMBER OF CDLA AND LISTED ON THE NEW YORK STOCK EXCHANGE

COMPUCOM

BUY-SELL-TRADE

RP07-AA \$26,250

RP07-BA \$28,750

RP06-AA \$13,250

RP06-BA \$15,750

COMPUCOM INC.
3404 OAKCLIFF RD., C-4 ATLANTA, GEORGIA 30340
(404) 452-1090 / TWX 810-757-0202

System/34
Printer &
Displays
Sale/Lease

3880 3830
3803
Immediate Delivery

Controllers

3880 3830
3803
Immediate Delivery

Control Units

3274 3272
3276 3271
Immediate Delivery

WANTED

4341 Grp I or 2
For Outright Purchase
Or Purchase-Leaseback
Short or Long Term

DASD

3380 3375 3370
3350 3344 3340
3330 3310
Immediate Delivery

We Buy, Sell & Lease
IBM Processors and
Peripheral Equipment

Tape Drives

3420
3410 8809
Immediate Delivery

Printers

3287 3289
3203 3211
3262 1403
Immediate Delivery

Display Stations

3278 3277
Immediate Delivery



Contact Bernie Gest 215-782-1010
Computer Marketing Inc.
7704 Seminole Ave., Philadelphia PA 19126



buy sell swap buy sell swap buy sell swap buy sell swap buy sell swap

Control Data
126MB Removable Drives ..\$12,900
Diskette Drives\$ 1,495
Printers & Displays

SERIES I SPECIAL

IBM
4956 Processors
4967 200MB Disk Drives
All Peripheral & Features

New or Used
Immediate Delivery

Save Money On Your Present Equipment With Our Purchase/Leaseback Program

ALL UPGRADES

TERMINALS
3277 3287 5251
3278 5256

DISK
3340 3370 3375
3350 3380

PRINTERS
IBM - All Models
NEC - Letter Quality for S/34, S/38
DATAPRODUCTS - 340 CPS to 1500 LPM for all IBM Systems

LEASING
SHORT OR LONG TERM
NEW OR USED

SYSTEM 38
New or Used

SYSTEM 34/36

4300 3033 308X
New or Used

SERIES I
IBM & CDC
CPU's ALL MODELS
PRINTERS FEATURES
New or Used

IF IBM MAKES IT, WE CAN SAVE YOU MONEY -
whether you buy, lease or rent from us.
We also need to buy your owned or rental credit equipment. Call us for a quote.

Marshall Lewis & Assoc., Inc. ML & A
1921 E. Carnegie Ave., Bldg. H, Santa Ana, CA 92705
(714) 641-0366

BUY SELL LEASE
IBM Maintenance Guaranteed, Equipment Configured to Your Requirements.

IBM UNIT RECORD EQUIPMENT & DISK DRIVES
DISK PACKS, DATA MODULES, MAG. TAPE, DISKETTES

SALE OR LEASE

machines
026-029-082- 083- 084
085-087-088- 129- 514
519-548-557

disk packs
2316-3336(1)-3336(11)-3348(70)
5 MEG. TO 300 MEG. PACKS-NEW & USED
Highest Prices Paid for Used Packs & Machines

THOMAS COMPUTER CORPORATION
5633 W. Howard St. Chicago, IL 60648
800-621-3906 312-647-0880
Authorized Distributor - Memorex, CDC, 3M, BASF, Verbatim, Dysan

DEC

Check out our unbeatable combination—
huge inventory at low, low prices.

Call toll free 800-328-7000
In Minnesota (612) 894-4020

MIDWEST SYSTEMS, INC.
12117 Riverwood Drive, Burnsville, Minnesota 55337

IBM

SERIES/1 AND PERIPHERALS

4952 4955 4973 4966
4962 4963 4974 4978

SYSTEMS/34 ALL MODELS

5211 3262 5251 5256
5110 5120 5114 5103
3340 3344 3410 3411
3776 3777 3741 3742

SYSTEM/32
029 129

Want to Buy S/34 s & Series 1's All Models

GEMINI COMPUTER CORPORATION

Gene Nicholl
Headquarters
214-934-9152
14229 Proton
Dallas, TX 75234

E. R. McDonald
West Coast Office
213-704-9725
4526 Saltillo
Woodland Hills, CA 91364

CDC
3350

DOUBLE DENSITY
33502-A2's, B2's, Control Units, Dual Access and Fixed Head Features
CALL RUSS SCHNEIDER
(408) 241-3677
Marketex Computer Corporation

WANTED LESSEE

IBM
3370-A1 + (3) B1's
Stamford Computer Group
74 West Park Place
Stamford, CT 06901
203-324-9495

LPI
LEAS PAK INTERNATIONAL

IBM
34/36/38
S/36 Delivery Positions

30-60 Day Schedules
5251 & 5291 - Immediate Delivery
S/34 Short Term Rentals
Lease 34/36/38 - Our Delivery Position Or Yours
(817) 268-0023

SERIES/1
CPU's — DISKS
PRINTERS — DISPLAYS

SYSTEM/34-36
SYSTEM/38
SYSTEMS—UPGRADES
PERIPHERALS

BUY—SELL—LEASE
Call Roger Odom,
Gayle Drotar,
or Ken Winzen
901-767-9130

ECONOCOM
845 CROSSOVER LANE
P.O. BOX 240297
MEMPHIS, TENNESSEE 38124

S/38
S/36
S/34
Series 1

Buy... Sell... Lease...

• Immediate availability
• 5224 & 5291 • Upgrades
• Short term leases • Trade-ins
• Guaranteed IBM maintenance

The Datacomp Leasing & Service Group, Inc.
Toll Free 800/323-3289
Chicago 312/448-4300 New Jersey 201/467-8686

We Buy & Sell DEC
Systems Components

call: 713 445-0082
500 Kenck Ste C22
Houston, Tx 77060

Just A Reminder!

Info 83'

Computerworld will be distributing the October 10, 1983 issue from our booth.
In order to take advantage of this increased distribution
Reserve space Now
Classified Advertising Deadline is Friday, September 30th

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

617-879-0700 1-800-343-6474

buy	sell	swap	buy	sell	swap	buy	sell	swap	buy	sell	swap	buy	sell	swap
-----	------	------	-----	------	------	-----	------	------	-----	------	------	-----	------	------

SYSTEM/34
MODELS E & F
SHORT TERM LEASES
LIMITED QUANTITIES
QUICK DELIVERY
6 MO./TERM
SAVE 25%
12 MO./TERM
SAVE 38%
18 MO./TERM
SAVE 48%
CONTACT:
GAYLE DROTAR


ECONOCOM
845 CROSSOVER LANE
P.O. BOX 240297
MEMPHIS, TENNESSEE 38124
901-767-9130


1000
SERIES E, F, M
3000
SERIES II, III,
30, 33
7920
50 MB DISK DRIVE
7970E
1600 BPI TAPE DRIVE
2631B
180 CPS PRINTER
2622A
TERMINAL
& MUCH
MORE
encore
(213) 393-8268

“A COMPUTER LEASING COMPANY’S FINANCIAL STABILITY IS VITAL.”

We said that in 1973, when Randolph became a subsidiary of The First National Bank of Boston . . . and we say it again, because it is still true and even more important today.

As an important part of The First National Bank of Boston, one of the nation's oldest and leading financial institutions, Randolph has a built-in financial stability that continues to be unique in the third-party computer leasing industry.

LEASING COMPUTERS IS OUR ONLY BUSINESS.

Randolph specializes in leases for IBM 3081, 303X and 4300 computer systems and peripherals . . . firm evidence that we plan to perpetuate our computer leasing activity. Our people have an average of 18 years experience in the DP industry . . . from 360's to 3081's. They know all about alternative financing to be sure, but they also know their way around a DP department and the hardware in it.

WE SPECIALIZE IN SOLVING PROBLEMS.

Machine installed on a rental basis? Long wait for delivery? Stuck with a lease on your old machine? Own a 3081 but need cash? Whatever your problem, we can tailor a lease that will fit your exact needs and let you start saving money right away.

SAVE \$80,000 EVERY MONTH FOR THE NEXT 5 YEARS.

You can lease the same 3081 that IBM rents for more than \$180,000 per month from Randolph for less than \$100,000 per month. If you're renting an older machine, we can save you even more—and you'll get about 4 times the throughput in the bargain.

WHEN IS THE BEST TIME TO TALK TO RANDOLPH?

The sooner the better. But it's never too late, even if you already have a machine installed.

Our 19 years in computer leasing gives added assurance that Randolph will continue as the leader in the computer leasing industry . . . continue to live up to the terms and conditions of our agreements . . . provide upgrades . . . fulfill all of our commitments.

LET RANDOLPH HELP YOU GET THE SYSTEM YOU NEED NOW, NOW.

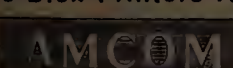
We've already done it for many of the Fortune 500 companies . . . and we can do it for you. Call Joseph B. Kelly, Jr., Executive Vice President, **800-243-5307.**

537 Steamboat Road
Greenwich, Connecticut 06830
203 661-4200

Randolph


THE FIRST NATIONAL BANK OF BOSTON
BANK OF BOSTON

A MEMBER OF COMPUTER DEALERS & LESSORS ASSOCIATION **RANDOLPH COMPUTER CORPORATION** A subsidiary of


BUY • SELL • LEASE
SERIES-1
S/34 • S/36 • S/38
4300
S/23 S/32 5110-20
Tape-Disk-Printers-Tubes

5200 W 73RD ST • MINNEAPOLIS MN 55435
16121835 • 4737
CALL TOLL FREE
800-328-7723


IBM For Less.
SYSTEM 36'S

- 2 OR 3 YEAR LEASES
- NEW AND USED PERIPHERALS
- TRADE-INS

**TexCom**TM

- Equipment Leasing Services

4403 N.W. LOOP 410
SAN ANTONIO, TX 78229
(512) 349-9955

WANTED TO BUY DEC EQUIPMENT VAX And PDP-11

Systems - Components - Peripherals
New Or Used

 **Meadowlark Enterprises**
Essex St.
Middleton, MA 01949
(617)777-4666

DATA GENERAL

We Buy, Sell And Service
New And Surplus Systems and Peripherals
Call Or Write
Hanson Data Systems
(outside Mass. toll free) (within Mass.)
1-800-225-9216 (617) 481-3901
P. O. Box 27, Southboro, MA 01772

FORSYTHE McARTHUR ASSOCIATES, INC.

DEALER / LESSOR OF IBM
Computers and Peripherals
FOUNDED 1971

Home Office
Chicago
919 North Michigan Avenue
Chicago, Illinois 60611
312 943-3770

Branch Offices
Atlanta 404 953-9457
Milwaukee 414 785-9544



buy sell swap	buy sell swap	buy sell swap	buy sell swap	buy sell swap
---------------	---------------	---------------	---------------	---------------

IBM SYS/34-IBM DISPLAYWRITER

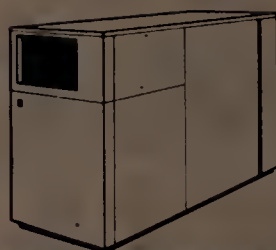
BUY—SELL—LEASE

- IMMEDIATE DELIVERY
- SHORT TERM RENTALS
- GUARANTEED SAVINGS
- GUARANTEED M/A
- PERIPHERALS
- UPGRADES

Call ...

MARION

(1-800) 631-1914
(201) 343-4554
(203) 758-2409



84 KENNEDY STREET
HACKENSACK, N.J. 07602

FOR SALE HP 3000 44 SERIES

With 4 265K Memory Modules, 5 2631 Printers, 23 2629 F Terminals, 1 7925 Disk Drive Master, 2 7925 Disk Drive Slaves, 2 2608 Printers, 1 Topaz Power Unit, 1 Air Conditioning Unit. Also 1 CPT 8100 Word Processor/Printer, 2 CPT 8000 Word Processors/Printers. Accepting sealed bids until 3pm on October 14, 1983. The highest or any offer will not necessarily be accepted. Contact Gregg Brown/Stew Scothorn, First Interstate Bank of Denver, (303) 293-5139/(303) 293-5624.

1/2" MAGNETIC TAPE

Magnetic Media Inc. Tulsa OK, the leader in 1/2" computer tape certification, uses IBM Surface Finishing technology to bring you IBM Multi-System quality new MAGNUM and re-certified MMI tape. All tape is individually reel tested and guaranteed permanent error free for use at 800-6250BPI. All new MAGNUM is guaranteed to 2 or less erase gaps (temporary errors). Recertified MMI tape is guaranteed to 5 or less erase gaps. All tape guaranteed to meet specifications on your drive or full refund provided. (Call for best price on IBM Multi-System and BASF tape).

MAGNUM (new)	1-99	100-999	1000+
2400' w/EL II or III	\$13.95	\$13.25	\$12.95
1200' w/seals	\$ 8.95	\$ 7.95	
600' w/seals	\$ 6.45	\$ 5.95	

MMI (recertified)
2400' w/seals \$8.95 any quantity
(full reels-all labels removed)

Call toll free

1-800-331-7226

The nationwide market - a call away!

DEC/DC

SYSTEMS/PARTS/PERIPHERALS
NEW/USED/SURPLUS • DISCOUNT PRICES
Since 1977! Buy, Sell, Trade and Broker.

PHIL
DG

BRYAN
11-VAX

JENNIFER
8-LSI

CALL TODAY - (305) 392-2005

TELEX 568-670

thomas business systems, inc.

4301 Oak Circle - Unit 11 Boca Raton, Florida 33431

NPA

Integrity today for a tradition tomorrow

SYSTEMS INC.

SPECIALIZING IN:
PURCHASE
SALE, TRADE,
LEASE, RENT,
AND SERVICE OF

Data General
EQUIPMENT



14,000 SQ. FT. WAREHOUSE, FULLY STOCKED
761 COATES AVENUE, HOLBROOK, N.Y. 11741

TELEX # 510 222 0882

(516) 467-2500

IBM SYSTEM/38 FOR SALE

1536K, 64MB, With Many Additional Features

3370-A11 Direct Access Storage, 570MB

6670 Laser Printer

15 Of 5291-1 Display Stations Available Immediately, IBM Maintenance Qualified

For Information

Call Linda Hirschfeld
914-694-4757

digital

VAX-11/750 Upgrade

For DEC VAX-11/750 machines with a 2MB limit. Upgrade your CPU and add two extra megabytes. We also accept your old 256KB cards in trade.

Call Toll Free:
1-(800)-222-EMC2

EMC² EMC Corporation
385 Elliot Street
Newton, MA 02164
(617) 244-4740

Registered Trademark of Digital Equipment Corporation.

C.D. SMITH & ASSOCIATES, INC.

DEC computer systems & options
12605 East Freeway, Suite 318
Houston, Texas 77015
(713) 451-3112
TELEX 76-2547

DEC

WE ARE BUYING: 11/780, RP06

WE ARE SELLING:

11/750-CA
MS780-DC
MS780-CC
FP780-AA
DW780-AA
H9602-HA
RH780-AA
MS750-CA
FP750-AA
RH750-AA
11/750 FUJITSU EAGLE

If you want on our Mailing List,
call Valerie (713) 451-3112.

Inflation Fighters

Quality & Savings

Slightly used, Money Back Guarantee. Full Reels. All External Labels Removed. Guaranteed for use at 800 BPI through 6250 BPI.

2400' Reel \$4.95 ea.
1200' Reel \$4.25 ea.
600' Reel \$3.50 ea.

All Tapes with Hanging Seals
We pay freight on orders over 200 tapes.
All orders shipped within 48 hours.
Call or Write

Computer Tape Mart
44A Seabro Avenue
N. Amityville, New York 11701
[516] 842-8512

DATA GENERAL SPECIALISTS

FOR
Surplus New & Used
Equipment & Systems
with full depot repair facilities.

CALL US
WE TAKE THE TIME.
- WE CARE -

JM Associates
601 W. Chapel Avenue
Cherry Hill, NJ 08002
609-663-1115

There's No Time For DOWNTIME!

And that goes for your business as well as your computer system!

So, while the industry works on your system's problems, let us work on your business problems and advertise in--

COMPUTERWORLD CLASSIFIEDS!

One insertion will let a potential audience of over a half a million readers know what you are looking for or have to offer. Whether you are looking to recruit computer professionals, want to buy, sell or lease equipment, have computer time or services to offer, or software packages to sell, and more, **Computerworld Classifieds** will help you get a lot of exposure and get things done faster.

The open line rate is \$8.05 per line and there is a minimum size of 1 column by 2" at a cost of \$225.40. We can accommodate up to 5 columns and depth measurement increases by half inch increments.

Ads may be mailed in, cleanly typewritten, with a letter stating the size desired and the issue in which it is to be run. Our team of adtakers will take ads that require no extensive artwork or borders over the phone. We also provide telecopier service.

Any borders, logos, or artwork should be sent in with your ad and must be dark and clear enough to be reproduced.

Computerworld comes out every Monday and our deadline for receiving ads is 10 days (or six working days) prior to the issue date desired.

First-time advertisers must send payment along with their first ad.

Our mailing address is:

Classified Advertising
Computerworld
Box 880

375 Cochituate Road
Framingham, Mass. 01701



CW COMMUNICATIONS/INC.

Buy - Sell - Lease

S/32
S/34
S/38

IBM



CPU's CRT's PRINTERS
ALL MODELS
PURCHASE LEASEBACK
SHORT & LONG TERM LEASES

Computer Marketing
of America, Inc.
P.O. Box 90907
422 Acklen Park Drive
Nashville, Tennessee 37209



1-800-251-2670

In Tennessee: 615-297-7516

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap



AMERICA'S LEADING
SPECIALIST SERVING
THE USED MARKET
REGIONAL MARKETING OFFICES

Atlanta, GA (404) 256-7942
Boston, MA (617) 367-5755
California (408) 773-1614
Dallas (415) 956-3183 (714) 752-8443
Chicago (312) 693-2790
Dallas, TX (214) 385-0806
Houston, TX (713) 780-7459
New Jersey (609) 645-7282
New York City (212) 349-0718
Tampa, FL (813) 273-8028 or 273-8029
Tennessee (615) 449-6633
Washington, D.C. (703) 442-4941
Geneva, Switzerland Telex: 289950 WTCG
Montreal, Quebec (514) 871-1121
Paris, France Telex: 613910 CMI FR
Toronto, Ontario (416) 673-3081
Windsor, Ontario (519) 973-3910

CMI FINANCIAL SERVICES GROUP
755 W. Big Beaver, Troy, Mich. 48084
(313) 362-1000



755 W. Big Beaver, 19th Floor, Troy, Michigan, 48084
TWX/TELEX: 810 232-1667 CMI CORP TRMI

(313) 362-1000

New CMI 4300 Series Hotline Number: 800-331-4300

A Turnmark Company



Member CDLA

3033-U16

Fully Featured
Available Now
Lease or Sale

USED
3081-D's
or K's
For Sale or Lease

Series 1
New 4956B's, 4967 Disk
Used 4955F's, 4955E's
Immediate Delivery
Buy-Sale-Trade
Leases Available

3033-N8

Fully Featured
Available Now
Lease or Sale

3081/3083/3084
Lease Financing
Available
For Your System or Ours
2, 3, 4 or 5 Year Terms

Series 1 I/O
New or Used
IBM/CDC/Printronic/
Datam/Data South/NEC
Printers - ASC11/3102
180 CPS-1130 LPM
Tape Cassettes - Back-up Unit
Datum 20MB-45MB
Disks - Fixed/Removable
9.3MB-240MB
Buy-Sale-Trade Leases Available

3033

S to N N to U
Upgrades

Wanted
4341-M2
4341-L01
Call Now

3350 3880 3830
3340 3370 3330
3375 3380

Buy/Sell/Lease

Pat Callahan
Tim Ryan

SYSTEM 36

Monthly Lease Rates
Lower Than IBM Credit Corp.
2, 3, 4, or 5 year terms
Includes System 34 takeouts

4525
2000 LPM Printer
Delivery Positions Available 10/1/83
Monthly Lease Rates
Lower Than IBM Credit Corp.
Bob Laurie

3800
LASER PRINTERS
Model 1's
Available for Immediate Delivery
Model 3
Lease Financing Available - Any Term
Mary Drangin

AMDAHL V8 and V611

Available for
Sale or Lease

NEW 5224 PRINTERS

Greater Discounts Than IBM
Leases Available
5224-1 (140 LPM) \$ 165/mo.
5224-2 (240 LPM) \$ 188/mo.
Call For Short Term Rates
Immediate Delivery
Kevin Schaefer

3705-3704

Available for
Immediate Delivery
Sale or Lease
We Can Supply Models E through K
Call Us For Purchase/Leaseback
Of Your MLC Machines
And Save 50% Of Your Monthly Cost

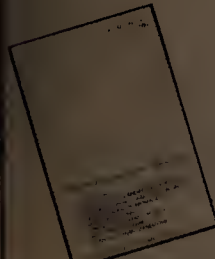
SYSTEM/38

One of 10 reasons why you should
lease your System/38
from ECONOCOM.

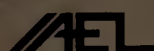
SIZE

We're large enough to handle any
size transaction but small enough to
want your business—and, willing to
work hard to keep it.

For a copy of our brochure outlining all 10
reasons to deal with ECONOCOM call
Nancy Hurley at 1-800-238-3098 or write—



845 CROSSOVER LANE
P. O. BOX 240297
MEMPHIS, TENNESSEE 38124



→ NCR USERS
Are You Thinking
of Trading Up ↑ ?
or Down ↓ ?

Call Us for a Quote



SMITH ANDERSON CORP.
619-340-6688

Authorized NCR Systems
Distributor - Nationwide
(New or Used Systems)

71-866 Highway 111
Rancho Mirage, Calif. 92270

IBM

3270

PRINTERS, TERMINALS
& CONTROLLERS

Please Call: (312) 943-3770
Forsythe/McArthur Associates
Inc.
919 North Michigan Avenue
Chicago, Illinois 60611

ALL IBM COMPUTERS ARE CREATED EQUAL
BUT, ALL IBM BROKERS ARE NOT!! CALL US



EXPERTS IN
IBM
BUY • SELL • 72 HOUR
UPGRADES

S/34 IMMEDIATE DELIVERY
ALL PERIPHERALS AND FEATURES
40% TO 50% OFF LIST

S/32 • S/38 • SERIES I • ALL IBM EQUIP.
NEW S/23 — LARGE DISCOUNT!!

GUARANTEED !!

IBM MAINTENANCE • DELIVERY DATES

WANTED —

- ALL S/34 CONFIGURATIONS
- ALL S/34 & S/38 PERIPHERALS
- ALL LEASED & OWNED MACHINES

BUYING OR SELLING EQUIPMENT

WE WILL LIST YOUR EQUIPMENT ON A COMPUTERIZED READOUT. IN
MINUTES ALMOST EVERY BROKER AND DEALER IN THE COUNTRY WILL BE
INFORMED OF YOUR PENDING SALE OR PURCHASE OF EQUIPMENT.

7578 TRADE STREET
SAN DIEGO, CA. 92121

CALL
COLLECT

PAUL CAYTON
(619) 578-5410

FOR SALE OR LEASE System/36-B24

512K, 400MB, 2 Comm Lines, Work-
station Expansion, 3262 Attachment

Available Now

Will Take System/34 in Trade
CPU Sales and Leasing Inc.
(503) 222-2226

C
P
U

Call Us First or Call Us Last
But Call Us For Sure!
BUY • SELL • LEASE

Processor	Peripherals	Banking Equipment
S/23	3741	1255
S/32	3742	1419
S/34	029/129	3600
S/38	5211	
5110	5251	
5114	5225	
5120	5256	
DATA MASTER	3262	

Southern
Data Systems 800-251-2614
or (615) 352-6565
1000 Highway 100
Nashville, Tennessee 37203

FOR DEC VT's

We Can Deliver

CALL SCHERERS

6145 Scherers Place
Dublin, OH 43017
614-889-0810

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap



Need to Upgrade?
Call Us Second
(Right after you've talked to IBM!)
JUDY, MARILYN AND DEBBIE
WILL SAVE YOU MONEY

Call **214-258-0541** Today!
System/32s, 34s, 38s, 4300s,
3270s, 370s, all peripherals and I/O...much more!



METROPLEX COMPUTER COMPANY, INC.
320 Decker Drive • Suite 180 • Irving, TX 75062 TWX 910-860-9285

BUY, SELL, LEASE 5120
4300's/3
S/38, S/1
Call Collect:
404-252-7480
S/36
S/34
DATAMARC
6065 Roswell Rd.
Atlanta, GA 30328
All IBM Peripherals

FREE
DEC and
DATA GENERAL
Discount Guide
Call or write for your copy TODAY!
NEWMAN
1250 N. Main P.O. Box 8610 Ann Arbor, MI 48107
(313) 994-3200 S93JCW

VAX SYSTEMS
Full Turnkey Systems
REP07-AA 28K
6250 Tridensity Tape Drive
W/Formatter & Controller 26K
ERGO-301 (VT-102 Compatible) 800.00
Dataroyal Printers
Fujitsu Disk Drives
Emulex Controllers
UNIX Operating System
MANDERS BUSINESS SOLUTIONS, INC.
(303) 693-3035
2771 S. Jasper
Aurora, Col. 80013

IBM
3814-A2
4 X 8 Switch
9/30/83 Available
Jack McAuliffe
4255 LBJ Freeway #210
Dallas, TX 75234
214-661-3981

gms
Computer Systems
SOFTWARE & PERIPHERALS
RAINBOW TO VAX
COMPATIBLE ENHANCEMENTS
Los Angeles (213) 217-0161
Ventura/Santa Barbara (805) 656-1230
Orange County (714) 964-1997

3370 DISK
3350 DISK
LIMITED QUANTITIES
QUICK DELIVERY
CONTACT:

ECONOCOM
845 CROSSOVER LANE
P. O. BOX 240297
MEMPHIS, TENNESSEE 38124
(901) 767-9130

For Sale Or Lease
3274 Local & Remote Controllers
3278 Mod 2 Display Stations
3178 Display Stations
3287 Printers
3276 Mod 2, Or 12
Controllers - CRTs
Courier And Memorex
CRT Equipment Also

Contact Diane Prestigomo
Leasing Dynamics, Inc.
1717 East Ninth Street
Cleveland, OH 44114
(216) 687-0100
DLH

FOR SALE BY OWNER
IBM SYSTEM/38 Mod 453
Comm. (1 Line, BSC/SDLC)
Other Peripherals:
3370/A11 (8) 5251-11
3411/003 (2) 3751-11
3262/B01
Available November 1983
Contact:
Prime Motor Inns, Inc.
1030 Clifton Ave.
Clifton, NJ 07013
Attn.: Don Stevens
(201) 779-4100

SERIES 1
S/34 S/38 S/23
5110 4300 s/38
DISPLAYWRITERS
XERXES
COMPUTER SALES
Minneapolis, MN 612-339-3042
800-328-3884

We've Got Your Number
S/34 **SERIES 1**
ALL MODELS QUICK DELIVERIES CONFIGURED TO YOUR NEEDS
S/38 **5110/5120**
NEW & USED MACHINES NEW LOW PRICES
PERIPHERALS
CRT'S...PRINTERS...DISK...TAPE...MODEMS

GARLYN
COMPUTERSYSTEMS
Wash., DC: 5105-Q Backlick Road Annandale, VA 22003
"CALL COLLECT" (703) 642-1950

DATA GENERAL
New & Used Equipment

mcintyre's
Mini-Computer Sales Group Inc.
(313) 583-4100
32050 Edward Ave.
Madison Heights, MI
TLX: 810-232-4866
Answer Back: MCDATAGEN MAHS

FOR SALE
REMITTANCE PROCESSING EQUIPMENT
• 36 Units Bell & Howell Model 350
• Remittance Processing Terminals
• OCR-A and 1428 Font Read Heads
• Endorsers-Journal Tape Printers
• Expanded Audit Trail Printer
• All Units Include Speed-Up Kits
• 20 Each-8K Memory
• 16 Each-16K Memory
• Currently on Vendor Maintenance
Any Inquiries or Bids Concerning the Equipment Should Be Sent to:
CONTACT: Rick Soto
CITIBANK (South Dakota), N.A.
P.O. Box 6000
Sioux Falls, South Dakota 57117
(605) 331-2844

• **BUY**
• **SELL**
• **SWAP**
.....
Well-Equipped To Serve You In Buying Or Selling
.....
• **HARDWARE**
• **SOFTWARE**
• **COMPUTER TIME & SERVICES**
Over 500,000 computer people read **COMPUTERWORLD** every week.
So placing an advertisement with us is going to help you take care of your computer-related business... very quickly.
.....
Call **1-800-343-6474** or send materials to:
COMPUTERWORLD Classifieds
375 Cochituate Rd.
Box 880
Framingham, MA 01701

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

WE'VE GOT THE RIGHT NUMBERS

The Right IBM Numbers

The Right Lease Numbers

4341

All Models
12-24-36-Month
Leases Available

3178
3278

Special Lease Plans
for VPA's

3081

All Models
48 and 60-month plans
New or Used

3083

All Models
36-48-60-Months

3375's
3380's
3880's

Immediate Availability

S/36

Short-term
Leases Available

And, we can put the right numbers together.

**Computer Sales International, Inc.**
P.O. Box 16264, St. Louis, Missouri 63105

Member
Computer Dealers
& Lessors Association

Toll Free: 800-325-0960
St. Louis, Missouri (314) 727-7010
Houston, Texas (713) 444-0246
Tampa, Florida (813) 963-5556

*******DEC*******

BUY—SELL—LEASE—TRADE—CONSIGN

SYSTEMS — PROCESSORS — OPTIONS
PERIPHERALS — MODULES — MEMORY
— SPARES —

NATIONAL COMPUTER EXCHANGE

800-854-7224

6980 Aragon Circle, Suite 5 • Buena Park, CA 90620
(In Calif.)714-522-1870 TWX:910-596-1499

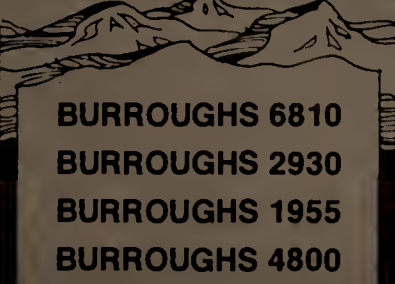
TEXAS INSTRUMENTS (NEW)
TI 743.....\$786
TI 745.....\$1036
TI 763.....\$2129
TI 765.....\$2366
TI 781.....\$1102
TI 785.....\$1576
TI 810.....\$1339
TI 820.....\$1576
ADDS (NEW)
Viewpoint A2.....\$550
Viewpoint A3.....\$510
Viewpoint 60.....\$730
Viewpoint 90.....\$965
DIABLO (NEW)
630 RO.....\$1795
630 KSR.....\$2480
NEC SPINWRITER (NEW)
NEC 3550.....\$1945
NEC 7710.....\$2208
NEC 7715.....\$2231
NEC 7720.....\$2573
NEC 7730.....\$2208
QUANTITY DISCOUNTS AVAILABLE
We Also Discount Computers - NEC
QANTEL - Texas Instruments
THE SKIERS • 516-242-8996
PO Box 754 • 1145 Walt Whitman Road
• Melville, New York 11747

Hi! Let's talk! We want to tell you about our flexible plans for buying, selling, leasing, renting, purchase/leaseback of IBM System 34 & 38 and 3741/3742. We have a large inventory of CPU's, CRT's, and printers. We'll even talk about System/36!



**Pearl Computer Division**
•P.O. Box 24026 •4717 Centennial Blvd.
Nashville, TN 37202 **(615) 383-8703**

Call John Spight
or Ken Warren

**BURROUGHS 6810
BURROUGHS 2930
BURROUGHS 1955
BURROUGHS 4800**

**ASI**
2480 W Alameda Ave
Denver Colorado 80223
(303) 922-8331
Telex 910-931-0483

Member
Computer Dealers
& Lessors Association

BUY•SELL•LEASE

SERIES/1
SAVE ON NEW OR USED
OVER 2000 CUSTOMERS

**S/38
4331
4341**

ALL RELATED PERIPHERALS

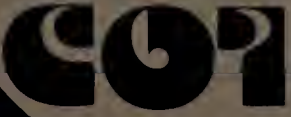
S/34
SEE OUR NEW PRICES

S/36
SHORT/LONG TERM LEASES

**3033
3081**

3350	3370	3340
3380	3375	3344
3411	3420	3430
3278	3274	3276

Call toll-free 800-328-5718
(in Minnesota, 612-544-8660)

**COMPUTER OPTIONS, INC.**
"the best option"
1660 South Highway 100
Minneapolis, MN 55416

COLA

ASCD

BIDS & PROPOSALS

Eastern Kentucky University, Richmond, Kentucky has computer equipment for sale by sealed bid. Bid forms may be obtained in the Division of Purchases, phone (606) 622-2246. Bids are to be opened October 12, 1983.

The Omaha Public Power District invites proposals for an interactive computer software package to perform electrical distribution planning and analysis and to install this software on either the District's IBM 4341 mainframe or on a minicomputer supplied by the vendor. Interested vendors capable of providing such a package may obtain copies of the specifications by contacting:
E. Morrisette, Manager-Contracts
Omaha Public Power District
1623 Harney Street
Omaha, NE 68102
Tel. (402) 536-4680
Requests will be received until 4:30 pm October 7, 1983.

AVAILABLE IMMEDIATELY
 Nationwide Installation
 Maintenance Full Warranty
 Choice of 50 or 60 Hertz
\$AVE • \$AVE • \$AVE
 YOUR COMPANY NAME
 000000000000
 000000000000
 (555)555-5555

HONEYWELL

The Bulletin Board

Buy • Sell • Lease

Buy • Sell • Lease

Buy • Sell • Lease

Buy • Sell • Lease

SPERRY UNIVAC

V-77 800 SYSTEM
(2) 256K CPU w/2 Pages WCS
(2) 8433/20 200 MB Disk Drives
(4) 10 MB Disk Drives
(2) 600 bpi Tape Drives
(2) 800/1600 bpi Tape Drives
(1) 300 LPM Printer
(1) 600 LPM Printer
THE EXCHANGE (206) 644-7000
Ask for TOM BASS

HEWLETT PACKARD

HP 3000
BUY & SELL
Complete Systems
Memory • Terminals
Disk Drives • Tape Drives
Miscellaneous Parts
ConAm Corporation
(Formerly Finley & Associates)
(800) 643-4954
(213) 458-2643

SPECIAL SPECIAL
2631B Printers
2622A Terminals
2624B Terminals
For immediate shipment
Call Bruce Or Jean
PVF
(301) 948-2684
1-800-638-8795

Buy-Sell-Lease
HP3000 3X, III, 4X
and related peripherals
Call Carol
CSU INDUSTRIES, Inc.
516-239-4310

For Sale
HP 3000 Series 44
Complete System Including
(8) HP 2621P terminals
(2) HP 2624A terminals
Available Immediately
Call Craig or Brenda
(516) 938-1900

The Bulletin Board
makes selling
your
equipment easy!

MISC.

Buy • Sell • Lease DATAPOINT

Cougar Computer Corp.
Suite 219
26250 Euclid Office Plaza
Euclid, OH 44132
(216) 261-3500

2 NIXDORF 600/35 CPU'S
W/COMM. CONTROLLER
2 TAPE DRIVES 9/1600
2 4.8 MB DISK STORAGE
2 300 LPM PRINTERS
8 DATA TERMINALS 1920 CHAR.
7 DATA ENTRY DESKS
\$42,000 BUYS ALL
(313) 296-4710 ASK FOR PAUL

Prime

Want to Buy
**Prime or Kennedy
Tape System**
800/1600 BPI, 75 IPS
with Single Board Controller
Contact Dennis Love
(213) 680-0860

For Sale
**Prime Unit
Record Controller**
URC-Model #3156-901
Contact Dennis Love
(213) 680-0860

MISC.

FOR SALE
DATAPOINT EQUIPMENT
Specializing in Infoswitch LDCS
Systems and Components
Call Gus Orr
RESALE SYSTEMS
(215) 827-7411
Equipment Qualified for
Datapoint Maintenance

Your ad can be
seen here
for just \$115.

HONEYWELL

**HONEYWELL LEVEL 6/DPS 6
USERS RUNNING
GCOS6 MOD 600**

We are interested in estab-
lishing a users alliance to in-
sure future enhancement and
support of the MOD 600 OS.
If you are using this product
please contact:

John Bailey or Mike Johnson
The University of Tulsa
600 S. College Ave.
Tulsa, OK 74104
(918) 592-6000
Ext. 2296

L62, L64
L6000, L6600
PERIPHERALS
TERMINALS
URS
66 Montvale Ave.
Stoneham, MA 02180
(617) 438-4300

**LEVEL 6 & DPS 6 EQUIPMENT
NEW & REFURBISHED**
Systems • Peripherals • Memory
CRT's • Applications Software
SUBSTANTIAL DISCOUNTS!!
Boudreau Computer Services Ltd.
100 Bearfoot Rd.
Northboro, MA 01532
(617) 393-8839
TWX 710-347-7574

WANG

THE BIGGEST WANG
dealer in Wang Equipment &
Plug Compatible has
ADVANCED PRODUCTS!
• VS-80 to 2 MEG
• VS Universal IOP
• 2200 DPU for Phoenix and 300 MEG
CALL STANDARD DATA
Advanced Products Department
800-528-0791 201-884-0920

TIME MANAGEMENT?

EXECUTIVE SECRETARY II. Sophisti-
cated messaging/calendar/meeting
scheduling at a fraction of the cost of
Alliance for any VS on all work stations.
Send for VS Product List:
Minicomputer Interactive Systems, Inc.
9550 Firestone Blvd. Downey, CA 90241
24-Hr. Number (213) 862-1605

**Psssst...
WANG USERS.....**

HAVE YOU HEARD ABOUT THE
GROUP OF FORMER WANG EM-
PLOYEES IN ATLANTA WHO BUY &
SELL USED WANG EQUIPMENT AND
PLUG COMPATIBLES?
I.C.A. (404) 977-4388 or
1-800-241-3159

BUY-SELL
MVP/LVP OIS VS PC
Systems in Inventory
VS/80 MVP WPS5
And Peripherals
2264C 2246R 5536-4
GEM
(802) 277-8230

WANG

WANG
Systems - Peripherals
Memory Upgrades
"Largest Dealer in Pre-Owned
WANG Equipment."
Erst International Corp.
Call Toll Free: 1-800-FOR-ERST
In New York: 212-431-1100

For Sale
Wang VS 80
(2) 75 MB Disc Drive
(5) 2246S Workstations
300 LPM Band Printer
(1) Tape Drive
Contact Fred Felker
206-885-5656

WANG 2200 VS MINICOMPUTER
With 288 Meg Disk Drive
600 LPM Band Printer
Word Processing Unit
With Daisy Printer
And 4 Workstations
And Many Other Extras
Best Reasonable Offer
(212) 753-9595 Ext. 465

MISC. SYSTEMS

Datapoint

9213 Printer \$3,400
8211 (3) CRTs \$1,050 Ea.
Phone Stan Nystrom
816-587-9459

DEC

DEC BARGAINS

FP11A	\$1185
BDV11-AA	\$485
KK11-B	\$2875
PDP 11/34A-DC	\$3350
RX11-BA	\$1185
VAX 1MB MS730-CA	\$3,650
VAX 1MB MS750-CA	\$3,650
11/34A CPU Set	\$1,585
11/44 KE44-A 'CIS'	\$2,975
DZ11 MUX Brd.	\$1,125
DR780-AA	\$9,400
4A-MS780-C Spares Kit	\$7,800
MSV11-PK	\$1175
MSV11-PL	\$1575

CALL RAY
(617) 275-6800

DEC SYSTEMS

11/03 systems w/RL01 disk, LA180
printer., 64KB memory, RT-11
license \$4,500
Complete packaged 11/23 systems
with dual RL02 \$12,000
11/03 \$4,250
LA180 ptrs. w/interface & cntrlr. \$375
Other Configurations CALL
E.E.C. Systems Inc. (817) 443-5106

BUY	DEC	SELL
	New & Used	
CPU's	Cabinets	
Tapes	Terminals	
Disks	Modules	
	call for quotes	
	Pacific Computer Sales	
	2378 Walsh Ave	
	Santa Clara, CA 95051	
	(408) PDP-1170 TLX 172337	

DEC SPECIALS

• RP07-AA, Call
• TGU77-AB, Call
• CDC 9762, Call
• CDC 9766, Call
• RP06-BA, \$16,000
• RM02, Call
SEVCO INC. (617) 435-8938

Pick up Lease Payments
With Purchase Option
VAX 11/780 System
PDP 11/70 System
PDP 11/34 System
Many Peripherals
Call Wallace Gordon
(918) 251-1272

DEC

DEC
Disk Drives - Printers
Disk Packs - Tapes
Erst International Corp.
Call Toll Free:
1-800-FOR-ERST
In New York: 212-431-1100

BUY • SELL • TRADE
1134A\$3995 MS11-LD...\$1395
1145\$5995 MSV11-DD...\$ 325
BA11-KE.....\$1995 RH780.....\$2995
DMC11-AL...\$ 995 RK711-EA...\$5700
DMC11-MD...\$ 895 RP04/6-C...\$2995
M9312\$ 395 TS11-BA...\$9950
NEW YORK COMPUTER EXCHANGE
(516) 752-8666 (800) 645-9109

DEC NEW & USED
BUY — SELL — EXCHANGE
Systems • Processors • Memory
Options • Peripherals • Modules
LAKEWOOD COMPUTER CORP.
3260-9 Keller St., Santa Clara, CA 95050
(408) 266-2545

DEC PDP 11/34A
256KB Memory
RSX-11M License
10MB Disk/Dual Floppy Drive
4 PT-100 Terminals
Letter Quality Printer
\$12,000. or Best Offer
(213) 660-2019

DEC RM03's

(3) RMO3-AA \$7,500 ea.
(1) RH70 Controller \$750
Fitts Roberts & Company
Houston, Texas
(713) 774-9761

Call

(800) 343-6474

Or

(617) 879-0700

To Place

Your

Ad Today

IBM

IBM
S/34 S/38 43XX
Upgrades, Peripherals
Sys. 34 F37
Available 10/83
Computer Hardware, Inc.
(216) 585-0444

SYSTEMS 36
LEASES
RATES LOWER THAN PRIME
PROCOM
(212) 279-1717

For Sale
1419 MICR
Call Dick Boyce
(813) 722-4534

Operating leases!
System/36's
We beat IBM month-by-month rates by
10-40% on multiple installations. Will
handle site-by-site and take 34's in
trade. (203) 222-0170.
DATALEASE

IBM

SYSTEMS 34/36/38
Lease or Sale
WANT TO BUY S/34's
(FOR INVENTORY)
Models & Peripherals
WE PAY CASH
LEAS PAK INTERNATIONAL
Tel. (817) 268-0023

Buy • Sell • Lease
IBM
Cougar Computer Corp.
Suite 219
26250 Euclid Office Plaza
Euclid, OH 44132
(216) 261-3500

PRINT TRAINS

IBM 1416 & 3216
Bought - Sold - Lease
Repaired - Reconditioned
COMPU-ACT COMPANY, INC.
(813) 863-2461

FOR SALE
IBM 4341 MO2
Available Now
Call Will Lopez
(305) 873-7167
Eastern Airlines
Miami, FL

WANT TO BUY
SYSTEM/34's
MIDLAND FINANCIAL
(612) 559-7171

For Sale or Lease
1255-3
w/6360 (4300 series)
or w/6303 (SYS/34)
Available Now
ARWELL CORP.
(214) 385-7320

2 Each IBM
1403 Printers
1 Each 2821
Printer Control Unit
Call Bud Hensley
(916) 739-3407

Lease or Sell
(1) 3830-2 w/Madrida
(2) 3350-A2 w/8150 DASD
(4) 3350-B2 DASD
(2) 3350-C2 w/8150 DASD
(1) 3370-A1 DASD
(2) 3274-B1 w/8901, 8902, 8903
(2) 3203-5 Prtr ITC Avail
OCM, Inc.
913-381-2406

BUY..SELL..LEASE
CRT's & Printers
5291's, 5224's, 5225's
Available immediately with complete
IBM systems. Call regarding our flexi-
ble lease plans.
CERES CAPITAL CORP.
(212) 279-4467
(713) 627-7724

S/34 S/38 43XX
Upgrades, Peripherals
Available Now
3274 1B, 1C, 4331 K2 System
Vargo Companies
313-254-2850

FOR SALE
S/38
1MB CPU-256MB Disk
Save 26%
Call Ron Gibb
(914) 238-9631

FOR SALE
2501-B2
2520-B1
3344-B2F
Call (914) 238-9631
Computer Merchants Inc.

IBM

FOR SALE
3540-B1
3747-1 w/1660 & 7885
Call Matt Blaustein
(914) 238-9631

FOR SALE BY OWNER
I.B.M. 370/138 CPU w/512K
I.B.M. 3046 Motor Generator
3 ICA Lines
I.P.A.
Please contact Stan Guzik at the:
Regional Income Tax Agency
10107 Brecksville Rd.
Brecksville, Ohio 44141
or call 216-526-1143

Series 1

Buy/Sell/Lease
Call C.C. Elders
(214) 620-8380
(800) 527-0429

DATA GENERAL

FOR SALE-ECLIPSE SYSTEM
(1) C330 CPU, Cabinet, 1 Meg MOS
(2) 4075 I/O Subassembly
(1) 4196 1600 BPI Tape Sub Sys
(1) 6061 190 MB Disk Sub Sys
(2) ALM-8 With Comm. Chassis
(6) 6053 Terminal
(1) DCU 200 Data Controller
Contact Jerry Wilkinson
Asking \$49,300.- (214) 680-3984

NCR

SPREADSHEET
SOFTWARE
IDPS/IMOS \$450 IRIX \$495 VRX \$1000
30 DAY TRIAL - \$75
SOFTWARE PRODUCTS CO.
P.O. Box 18814
Wichita, KS 67218
(316) 682-1762

WANTED
USED NCR 6780
CHECK SORTERS
CALL NEAL MIX
(715) 359-0427

BURROUGHS

BUY SELL LEASE
All Systems & Peripherals
AVAILABLE
• B1855 Sys • B1955 Sys
• B90s • B900s
(Configured To Your Specs.)
SPECIAL: B1955 MEMORY
• SRI Terminals model 100 & 110
• TD830s, MT983s, MT985s
• 206 & 207 Style Disk Drives
• Various Tape Sub-systems
• Memory Upgrades
• Printers 9246 & 9249 Styles
Guaranteed Burroughs Maint.
Depot Maintenance Available
COMPUTER PROVISIONS
(216) 248-7878
(Member IBDA)

BUY • SELL • LEASE
B1700 • B1800 • B1900
(Custom Config. Install. Avail.)
B20 through B7800
206/207/225/235 Disk
B9246/47/49 Printers
Mag Tape Subsystems
TD830 • MT983 • SRI • Datamaxx
TU/DC/CP/TT Terminals
Installation & DEPOT M/A Available
UFP Corp. (312) 344-1600

SOFTWARE FOR SALE

BUILDING BLOCK SOFTWARE FOR IBM SYS/38 READY TO GROW

Choose your building blocks from these applications, which operate individually or in combination:

DISTRIBUTION

- Order Processing
- Billing
- Sales Analysis
- Inventory Control and Purchasing

MANUFACTURING

- Product Structure
- Product Standard Costing
- Inventory Control and Purchasing
- Master Production Scheduling
- Material Requirements Planning (MRP)
- Shop Floor Control and Costing
- Capacity Requirements Planning

FINANCIAL

- Accounts Receivable
- Accounts Payable
- General Ledger

RMS/38 ALL THE SOFTWARE YOU'LL EVER NEED

PCR's Resource Management System (RMS/38) is all the software you'll ever need to unleash the power of the IBM System/38.

An all-native mode application system, its modular "building block" design lets you build a comprehensive data base management system with a full range of integrated applications. As your needs change, you can expand RMS/38 to

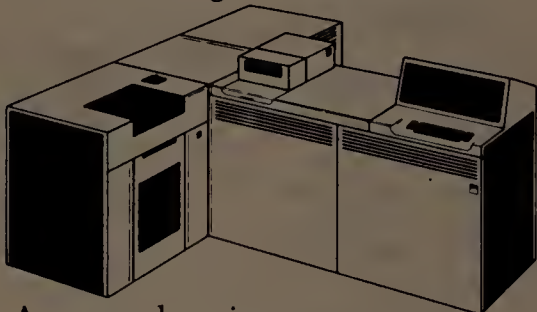
meet them. Without extensive modifications or high programming costs.

CALL FOR
DETAILS
312-
932-2200

PCR
2021 Midwest Road
Oak Brook, IL 60521

professional
computer
resources

Designed specifically for the
IBM System/38
and the Management Accountant



A comprehensive
**General Ledger,
Financial Reporting
and Budgeting System**
with an integrated, optionally available
Accounts Payable System

DHDial Company

Financial Accounting and Reporting Systems

Murray Financial Center, Suite 465
5550 LBJ Freeway, LB-1
Dallas, Texas 75240 • (214) 458-0987

DEC* Software Licenses

Why Pay List?

VMS, RSTS/E, COBOL, FORTRAN, ETC.

Savings of up to 50%

Immediate Delivery. Call for Quote



617-584-2800

MULTITRONICS INC.

340 MANLEY ST. W. BRIDGEWATER, MA 02379

Converting to COBOL? Call 800-558-5148*

- RPG/RPG II to COBOL
- COBOL to COBOL
- DIBOL to COBOL
- NEAT/3 to COBOL

Other Proven DASD Conversion Software

- CCP to CICS
- Universal File Translator
- FORTRAN to FORTRAN
- File Compare Utility

• Plus FREE "Conversion With No Surprises" brochure.

DASD

PEOPLE/PRODUCTS/RESULTS
DASD Corporation • Corporate Services Center
9045 North Deerwood Drive • Milwaukee, WI 53223 • 414-355-3405

Member of the Cap Gemini Sogeti group

*In Wisconsin, call 414-355-3405, collect.

Specializing in
IBM System/38
FRIEDMAN & ASSOCIATES, INC.
100 Winnet Road
Deerfield, Illinois 60015
(312) 948-7180

Totally on-line order entry,
complete manufacturing systems,
MRP with on-line net change

- Fixed price software including customizing
- Management consulting
- Ten years experience

We make it work!

THE WAIT IS OVER.

B.I.D.S. UNLEASHES THE POWER THROUGH HEWLETT-PACKARD COMPUTER SYSTEMS . . .

B.I.D.S. (BUSINESS INTEGRATED DATA SYSTEMS)

1. G/L - General Ledger	\$ 2,500.00
2. A/R - Accounts Receivable	\$ 3,500.00
3. A/P - Accounts Payable	\$ 3,500.00
4. PO - Purchase Order	\$ 2,500.00
5. INV - Inventory/Order Entry	\$ 3,000.00
6. P/R - Payroll	\$ 2,500.00
7. FA - Fixed Assets/Equipment Maintenance	\$ 2,000.00
10% Discount when Total B.I.D.S. Purchased	- 1,950.00
Demo Tape with Documentation	50.00
Total for All Modules within B.I.D.S.	\$17,600.00

VALLEY DATA BASE



50 East Evan Hewes Hwy. / P. O. Box 2655/El Centro, CA 92244 / (619) 353-0410

Sell
Your
Software
in
the
Classified
Pages
of

Computerworld

Call

800-343-6474

(or 617-879-0700)

for more info.

*Elegant
Software*

for IBM S/34, 36 and 38

General Accounting	Payroll/Personnel
Financial Reporting	Property & Equipment
Accounts Receivable	Report Writer
Accounts Payable	Oil & Gas
Order Processing	All Systems are:
Inventory Management	RPG II/RPG III
Sales Analysis	Data Base
Job Cost	Interactive

J.D. Edwards & Company

4949 South Syracuse Street/Suite 5500
Denver, CO 80237
303/ 773 3732

Dallas — 214/ 458 0636
Houston — 713/ 880 8278
Northern California — 415/ 697 7754
Southern California — 714/751 5302

1st Value Added Remarketer for the

IBM SYSTEM/38

See our full line of software at INFO '83
Space 5103 October 10-13
New York Coliseum, NYC

NEW GENERATION SOFTWARE, INC.

341 Lincoln Street, Roseville, CA 95678 Phone 916 969-8448
Outside California Call Toll Free 800 824-1220

NGS

software for sale	software for sale	software for sale	software for sale	software for sale
-------------------	-------------------	-------------------	-------------------	-------------------

Changing Computers?

Retain your SOFTWARE INVESTMENT

Dataware's conversion approach provides the solution to management's conversion problems and facilitates the recovery of the initial capital investment in systems development.

- COBOL to COBOL
- AUTOCODER/SPS to COBOL
- EASYCODER/TRAN to COBOL
- BAL/ALC to COBOL
- DOS/ALC to OS/ALC
- PL/I to COBOL
- RPG/RPG II to COBOL
- RPG/RPG II to PL/I

Faced with Conversion?
Call or write today

The Conversion Software People
Dataware, Inc.
2565 Elmwood Avenue
Buffalo, New York 14217
Phone (716) 876-8722
TELEX: 91519

SERIES/4 USERS

Having problems matching your EDX source listing with your executable code? Would you like a routine to stamp the assembly listing and executable code with the date and time of assembly and the software release level? Send us a blank diskette and we'll send you the fully-documented routines at no charge.

H & A Computer Systems
30 Hotelling Place #204
San Francisco, CA 94111
(415)434-3517

SERIES/4 SPECIALISTS

VAX PDP-11

Application Software

•General Ledger	•Automatic Restart
•Accounts Receivable	•Tailorable
•Accounts Payable	•Multiuser
•Payroll	•Multikeyed ISAM
•Job Cost	•RMS Files
•Order Entry	•Support Hotline
•Inventory	•Security System
•Fixed Assets	•User-defined Forms
•Client Writup	•Fully Documented

- Phone Demonstrations
- \$1 000 to \$3,500/module

**Compu-Share**
3824-50th Street
Lubbock, Texas 79413
(806)792-3785

Now available on TYMNET

ADD POWER TO COBOL WITH STRINGS

- 23 new COBOL instructions to manipulate strings
- LOAD, UNLOAD, ASSIGNMENT=, LENGTH, LEFT, RIGHT, MID, MID=, CONCAT, FIND, COMPARE, DELETE, DELETAI, INSERT, REPLACE, REPLALL, ONECHAR, ONEWORD, NTHWORD, VALUE, DISPLAY, DISPOSE
- A full implementation of the string data type for IBM mainframes. String lengths are maintained internally and can range from 0 to 4K bytes
- No working storage for strings required. Similar to BASIC programming -- but more powerful
- Not restricted to COBOL. String commands can be called by any language
- Built-in garbage collector
- Example: W1 = 3RD WORD IN S1 TO 1
W1 = W1 + SPACE + W2
- Only \$695.00

KOMPUTER SYSTEMS, INC.
1456 Wilbur Cross Hwy
Berlin CT 06037
(203) 828-0391

IBM 34/36/38

Para Research offers a different marketing approach for software. We provide the best software packages at lower prices. We do this to obtain volume sales, a larger user base and to encourage user feedback. This approach and the input of our many users have made us what we are today: the world's largest distributor of System/34 software. All packages are completely documented.

WORD PROCESSING

Easy Text, a new word processing system for the IBM System/34 or 36, presents an easy-to-use system with on-line documentation. Easy Text is so "user friendly" that users with no experience can generate letters, memos, reports and mass mailings almost immediately. Now every workstation on your computer can function as a word processor. Easy Text on the System/34/36 is \$750. On the System/38 it is \$1,500.

Priced at \$1,000, Paratext is the most successful and complete word processing system available for the System/34. There are more than 2,500 Paratext users. Paratext offers full-screen text editor, automatic justification, individual forms design, viewable corrections, heads-down typing, word wraparound, variable data insertion, label printing and math capabilities. Paratext is also available for the System/38 at \$1,500.

FINANCIAL MODELING

EasyCalc Management System for the IBM System/34 or 36 combines the best features of the best electronic worksheets. Use Easy Calc for budgeting, cash flow analysis and sales forecasting. Build formulas of up to 96 characters. Create worksheets with 52 columns and 999 rows. Consolidate 998 worksheets into one. And Easy Calc's built-in error detection actually pinpoints the exact position that needs correction. Learn Easy Calc in only a few hours. Available for the IBM System/34 at \$1,000, or the System/36 at \$1,500.

Paracalc, a diversified modeling system, calculates budgets, cash flow, sales projections, commissions, production forecasts, anything you can set up in rows and columns. Change one entry and all amounts are recalculated accordingly in up to 24 columns and 400 rows. The "HELP" screen displays all built-in functions and provides the formulas to access each function. Consolidation from many models to one. Return on investment model. Available on the System/34 or System/38 for \$1,000. With over 2,500 users, this is the most successful package of its kind.

GENERAL LEDGER

General Ledger is a fully-automated package for maintaining business records. It offers maximum flexibility, ease of use and a variety of reporting options. Users can produce trial balances; detailed income statements and balance sheets; reports for individual transactions; and all department and expense statements. General Ledger interfaces with other Para Research accounting systems. Available for \$1,000 on the System/34, \$1,200 on the System 36 and \$2,000 on the System/38.

ACCOUNTS PAYABLE

Accounts Payable reduces administrative and clerical costs, while allowing tight control over accounts payable functions. Various management reports provide timely and accurate information on the current status of all payables. The enhanced version allows you to: take a discount amount after discount date; select a single batch of vouchers for updating to open payables file; and report status of every vendor on a vendor analysis report. Available for \$1,000 on the System/34 and \$1,200 on the System/36.

PAYROLL

Payroll reduces clerical costs and gives users control over payroll processing. The employee master files for salary, hours and other payroll items are easy to maintain, and user-friendly prompts provide instructions for each procedure. Payroll will handle 99 companies and will run payroll processing for any combination of companies. Available for \$1,000 in the System/34, \$1,200 on the System 36 and \$2,000 on the System/38.

FIXED ASSETS

Fixed Assets, an easy-to-use depreciation scheduling program helps users produce two-year projections. It figures depreciation for user-specified periods based on the 1981 Economic Recovery Act using the Accelerated Cost Recovery System (ACRS) plus eight other depreciation methods. Management reports track depreciation schedules, report changes in those schedules, give projections over a two-year period. Available for \$1,000 on the System/34, \$1,200 on the System/36 and \$2,000 on the System/38.

ACCOUNTS RECEIVABLE

Accounts Receivable improves bookkeeping efficiency and reduces administrative tasks. This system is available in either open item or balance forward methods. For both methods, the system has cycle billing capability and allows printing of all statements on file or statements for specific customers. You can obtain up-to-date status of customer records, including current balance, aging and credit checking. Available for \$1,000 on the System/34 and \$1,200 on the System/36.

BILLING

The Billing System provides order entry and invoicing capability as well as analysis of inventory and sale of items within your company. You can generate picking ticket listings by warehouse or item number and maintain data on orders before shipping and invoicing. The system places order quantities in reserve until you confirm the order, then reduces the quantity on hand. This allows you to enter freight charges before the invoice is sent. Available for \$1,000 on the System/34 and \$1,200 on the System/36.

INVENTORY

The Inventory System gives your company complete control over inventory, both on hand and on order. The system provides reports to let you know the status of every item at any time. You can determine inventory costs based on four methods: LIFO, FIFO, average cost and replacement cost. Available for \$1,000 on the System/34 and \$1,200 on the System/36.



Call or write Software Sales, Dept. CW13, Para Research Inc., 85 Eastern Avenue, Gloucester, MA 01930 (617) 546-3446, 546-3413.

Need general accounting software for IBM System/38?

We've simply solved your problem.

LAWSON ASSOCIATES has solved it with the first general accounting software specifically designed for IBM System/38. Not merely compatible, but state-of-the-art to fully utilize your computer's capabilities. Compare. You won't find a total software solution like it anywhere else.

DESIGN FEATURES:
They include: on line systems using data base management; menu driven, user friendly programs written in RPGIII, the System/38 language; and integrated modules. Their

benefits: ease of installation and use, plus maximum employee productivity.

INTEGRATED MODULES:
Those available include: General Ledger and Report Writer/Accounts Payable/Accounts Receivable/Fixed Assets/Payroll/Purchase Order Order Entry/Inventory Control

SERVICE FEATURES:
Fully documented and supported. Onsite training and implementation. One year warranty. Available now for immediate installation.

For more information, please call or write:

NATIONAL SALES:
Lawson Associates
2021 East Hennepin Ave.
Minneapolis, MN 55413
(612) 379-2633

IN TEXAS:
Lawson Associates
5001 LBJ Freeway, Suite 175
Dallas, TX 75234
(214) 233-4474



LAWSON ASSOCIATES
WE SIMPLY SOLVE PROBLEMS

TIME & SERVICES

TIMESHARING VAX 11/780-VMS

• FORTRAN	Graphics
• BASIC	Author Programs
• COBOL	Custom Software
• DATATRIEVE	Hydrology Softw.
• Telenet Access	Petroleum Softw.
• Floating Point Accelerator	Low Rates
(Interactive Batch)	
• Direct Dial	Detailed Resource Acctg.

Volume Discounts

7-Day, 24 Hour Service

CONTACT: SHELDON SHEFTEL
IN-SITU INC.
999 18th St., Suite 1000
Denver CO 80202
(303) 293-2004

TIMESHARING AVAILABLE

VAX 11/780-VMS PDP 11/70-RSTS/E

- FORTRAN, COBOL, BASIC
- DATATRIEVE
- ORACLE ®
- STATISTICAL PACKAGES
- DECNET
- TYMNET ACCESS

CONTACT:
INSLAW, Inc.
Washington, D.C.
(202) 828-8600

© trademark of Relational Software, Inc.

RSTS/E TIME CHICAGO AREA

• BASIC PLUS	• DIBOL
• FORTRAN	• PASCAL
• BASIC PLUS 2	• "C"
• MCBA SOFTWARE	

\$7 per hour connect time
No Kilocore Tick or CPU Charges



Symtec, Inc.
760 Industrial Drive
Elmhurst, IL 60126
(312) 941-9380

DEPOT COMPUTER REPAIRS

DEC-DG ALL BOARDS

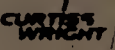
1-2 WEEK TURNAROUND

MEMORIES POWER SUPPLIES

DISKS PACKS AND TERMINALS
ANY MANUFACTURER



DIGITAL DATA SYSTEMS, INC.
1551 NW 65 Ave. Plantation FL 33313
305-792-3290
1-800-327-8662
TELEX-232005 ATT DIG

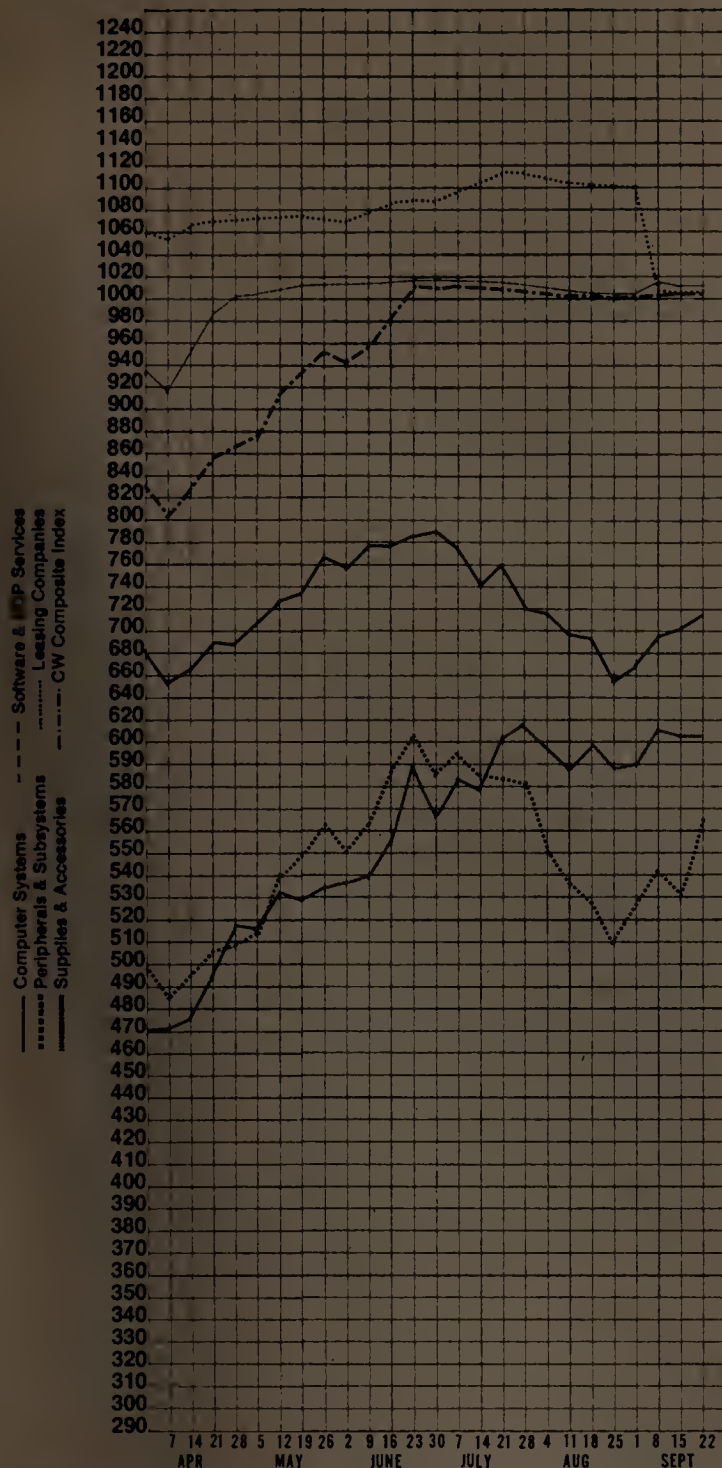
time & services	time & services	time & services	time & services	time & services
High Tech Repairs for Manufacturers, OEMs, and Field Service Organizations We're a large-volume high tech depot repair and re-conditioning center specializing in support of aging EDP product lines. Manufacturers We repair out-of-warranty OEM assemblies and DOA returns, and rework engineering change requirements — freeing your resources for manufacture of new products. OEMs We provide support for large-volume peripheral devices and plug compatibles, and offer quicker turn-around than the manufacturer — at a lower cost. Field Service We offer quick response, quality repairs, and reduce your shipping cost when we drop-ship reparables to your field office. Printers Disc Drives Memories Terminals Power Supplies PCB Assemblies Specialists in CDC Disc Repairs Nationwide Representation — Call Us Today COMPUTER SYSTEMS and SUPPORT Tymshare, Inc. 31355 West Agoura Road Westlake Village, CA 93161 213-889-6031 	 Computer Services 4341-2 370/158-3 VS1-CICS-ROSCOE-DOS REMOTE JOB ENTRY CICS DEVELOPMENT CICS PRODUCTION CUSTOMIZED SOFTWARE CONTACT JOE BARRETT (201) 777-3454 15 MINUTES FROM LINCOLN TUNNEL ONE PASSAIC STREET WOOD RIDGE, N.J. 07075	Computer Time PRIME 550-II Los Angeles Area \$750/Port/Month For Unlimited Use. PROJECT ECONOMICS (213) 640-2700	BUSINESS OPPORTUNITY	COMPUTER SERVICES Brokerage business for sale, Metro New York area. Volume \$900,000; highly profitable; undermanaged company. Tremendous potential. Write Box CW-B4274 Computerworld, Box 880 Framingham, MA 01701
	ICOTECH Innovative Computer Techniques COMPUTER SERVICES IBM 3081 DEC-10 -Remote Job Entry -Online Processing -Batch Processing -Timesharing -Optical Mark Reading -Laser Printing COMPUTER OUTPUT MICROFILM -Datagraphix Mini Auto-Coms -Datagraphix Datamaster -6250 BPI Capability -Free Testing Route 202 Raritan, NJ 08869 201-524-0153 Contact: Joyce Bogaenko	VAX AND PDP DEVELOPMENT TIME NO KILOCORE TICK CHARGES NO CPU CHARGES Omnicomputer™ \$7/\$14 RSTS/E VMS PER HOUR CONNECT TIME BUDGET BYTES™ 212-944-9230 Omnicomputer, Inc. 1430 Broadway, New York, N.Y. 10018		

ADVERTISERS INDEX

The Adesse Corp.	49	Eastern Airlines	91	On-Line Software	16
ADR	3	Eastman Kodak	4	Pansophic Systems	81
Amdahl	106	EMCE.....ID/9,SR/44-SR/45		Para Research	SR/24
Apple.....ID/20-ID/21		Envision Technology	52-53	Parallax Systems.....	8
Applied Computer Research	56	EPS Inc.	49	Perkin-Elmer	107
Applied Digital Data	100	Equitable Life Leasing.....	32-33,71	Phaze Information Machines.....	92
Autologic, Inc.	SR/43	Ericsson Information Systems.....	SR/8-SR/9	Prime	62-63
Axios.....	88	Execucom	73	Printronics.....	51
Aztek Computing Inc.	55	Exide Electronics	36-37	Questronics	111
Basic 4.....ID/12		Falco Data.....	152	Radio Shack	SR/35
BBN Research Systems.....	46	Four Phase systems	SR/30	RCA	ID/18
BDS Computer Corp.....	9	Fusion Products.....	39	Rolm	25
John Beall Co.....	101	General Electric.....24,ID/23,ID/24		Ross Systems	56
Beehive International.....ID/4-ID/5		General Optronics	43	SAS Institute	50,78
B.I. Moyle	72	General Research Corp.	92	Saturn Systems.....	99
Boeing Computer	SR/42	Graham Magnetics	93	Savant.....	116
M. Bryce & Associates	ID/17	Hambrecht & Quist	34	Science Research Associates	11
Broadway Information Systems.....	88	H & W Computer Systems	48	Shand, Morahan.....	10
Brown Disc Manufacturing	ID/26	Hamilton Rentals.....	57	Siemens.....SR/38-SR/39	
Burroughs.....	117	The Doug Hannah Agency.....ID/27		Signal Technology	112
Canned Software Inc.	SR/31	Honeywell Information Systems.....	SR/28-SR/29	Software A G	75
Cincom	SR/48-SR49	Houston Instruemnts.....ID/22		Southern Systems.....	35
Codenoll	ID/2	Hughes Aircraft.....	80	Sperry Corp.....SR/47	
Codex.....22-23		Human Designed Systems	115	SPSS Inc.....	83
Comdata Corp.	79	IBM	27,59	Star Technologies and Research	65
Commo.....	79	ICCP.....	50	Steel Heddle.....	82
Comnet.....ID/15		IE Systems	17	Syncsort	7
Computer Associates	70	Independent Computer Systems	SR/26	Systems Documentation, Inc.	SR/9
Computer Information Systems.....	SR/7	Infodata.....	5	Systems Management, Inc.....ID/7	
Compuware.....	67	Information Magnetics	66	T & B Computing	42
Comshare.....20-21		Information Science Inc.	108-109	Tandem.....28-29	
Control Data Corp.....SR/34		Innovative Electronics.....	48	Techland.....	40
Core & Code, Inc.....	50	Integrated Technology	SR/32	Technology Transfer	58,74
Corodale.....	66	Interface Group	110	Televideo Systems	84-85
CRWTH Computer Coursewares.....ID/17		Invitational Computer Conference	111	Televideo Terminals	44-45
CS Computer Systems.....ID/14		B.J. Johnson	ID/14	Telex Computer Products.....ID/6	
Cullinet.....40,41,112,113		Kennewick Industrial.....	42	Terminals Systems.....84-85	
CW Buyer's Guide.....	86	Kierulff.....	97	Term-Tronics.....SR/4	
CW Extra.....	104	K.W. Controls	26	Texas Instruments.....38-39	
CW Index.....SR/6		Lear Siegler	SR/40-SR/41	Thomas Engineering.....ID/16	
CW International	SR/31	Leasametric	ID/15	Tone Software	96
CW Micro	SR/16	Lee Data	102	TRW.....SR/5	
CW Supplement.....	98	Local Data.....ID/27,82		Unipress Software, Inc.	51
DASD	6	Martin Marietta.....ID/25		Unitronix Corp.....	87
Data Access System	64	McCormack & Dodge.....ID/10-ID/11		U.S. Robotics.....	14
Data General.....12-13		Memorex.....SR/22,ID/3		VM Software, Inc.....	94
Datamation.....	31	MicroAge	96	Walker Richer & Quinn.....	50
Datamedia	68-69	Microdata.....SR/12		Wall Data.....	30
Datasouth Computer Corporations. SR/36-SR/37		MicroFrame.....	82	Wicat systems	SR/21
Datasphere	42	MTI Systems Corp.	SR/23,SR/25,SR/27	Wild Hare Computer SystemsSR/23,SR/25,SR/27	
DEC/ Acces. & Supp.....	18	National Trade Productions.....	89	Wolfe Computer Testing	ID/18
Decision Point Marketing	42	NEC.....SR/10-SR/11,SR/50-SR/51		Xerox Corp.....	47,95
Desktop Software	72	Newcorp.....	15	Zenith	90
DEST	8	Nixdorf Computer Corp.....SR/33		Ziff-Davis	103
Dialogic.....76-77		No Halt Computers	ID/28	Zilog Inc.....SR/52	
Digital Assoc.	19	Northern Telecom	ID/19,ID/29-ID/36	Zytron.....	114
Digital Research	SR/13-SR/20	Omni Offices, Inc.	16,ID/19		
DMW Group	ID/8				
Dupont	31				
Dynacalc	110				
Dysan Corp.	105				

This index is provided as an additional service. The publisher does not assume any liability for errors or omissions.

Computerworld Stock Trading Index



Computerworld Sales Offices

Vice-President/Sales/Donald E. Fagan
Director/National Sales/Edward P. Marecki
Marketing Support Manager/Kathy Doyle
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701
(617) 879-0700

BOSTON SALES OFFICE (617) 879-0700
Northern Regional Manager/Chris Lee
District Manager/Jim McClure
Sales Assistant/Alice Longley
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701

CHICAGO SALES OFFICE (312) 827-4433
District Managers/Arthur Kossack,
H. Newton Barrett, III
Sales Assistant/Jean F. Broderick
Northern Regional Manager/Chris Lee
COMPUTERWORLD, 2600 South River Road, Suite 304,
Des Plaines, IL 60018

NEW YORK SALES OFFICE (201) 967-1350
Eastern Regional Manager/Michael Masters
Sr. District Manager/Doug Cheney
District Managers/Ray Corbin, Joan Daly
Account Executive/Fred Lo Sapio
Sales Assistant/Gale M. Paterno
COMPUTERWORLD, Paramus Plaza I,
140 Route 17, North, Paramus, NJ 07652

LOS ANGELES SALES OFFICE (714) 556-6480
District Managers/Bob Hubbard, Bernie Hockswender
COMPUTERWORLD, 18008 Sky Park Circle, Suite 260,
Irvine, CA 92714

SAN FRANCISCO SALES OFFICE (415) 421-7330
Western Regional Manager/William J. Healey
Account Managers/Barry Milione, A.G. Germano,
Theodora Franson, Ernest Chamberlain
Account Manager, Classified/Nicole Boothman
COMPUTERWORLD, 300 Broadway, Suite 20.,
San Francisco, CA 94133

ATLANTA SALES OFFICE (404) 394-0758
District Manager/Jeffrey Melnick
Eastern Regional Manager/Michael Masters
COMPUTERWORLD, 1853 Peeler Road, Suite D,
Atlanta, GA 30338

CLASSIFIED ADVERTISING (617) 879-0700
Al DeMille, Bill Cadigan
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701

CW INTERNATIONAL MARKETING SERVICES
Manager/Diana La Muraglia
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701
(617) 879-0700

For foreign sales offices, see Page 2.

CW COMMUNICATIONS/INC.

Board Chairman/Publisher
Patrick J. McGovern

President

W. Walter Boyd

Senior Vice-President
Lee Vidmer

Group VP-Communication Services, Jack Edmonston. Group VP-Circulation, Margaret Phelan.
VP-Marketing, Donald E. Fagan. VP-Finance, William P. Murphy. VP-Editorial, John Whitmarsh.

Computerworld Headquarters: 375 Cochituate Road, P.O. Box 880, Framingham, MA 01701
Phone: (617) 879-0700, Telex: 95-1153.

SALES Vice-President, Donald E. Fagan. National Director, Edward P. Marecki. Corporate
Advertising Administrator, Frank Collins. Marketing Support Manager, Kathy Doyle.
Display Advertising Supervisor, Anne Hadley.
Display Advertising, Deborah Bryer, Pam Valentinas, Elaine Carlos, Carolyn
Medeiros, Cindy Chekas. Classified Advertising Manager, William J. Mills.

COMMUNICATION SERVICES Group Vice-President, Jack Edmonston. Director Research, Kathryn Dinneen.
Sales Promotion Manager, Noreen Kimball.

PRODUCTION Production Director, Peter Holm. Production Manager, Marlene Stibal.
Supervisor, Trish Gaudette. Systems Manager, Tom Pfau.
Typesetting Manager, Carol Polack. Art Director, Tom Monahan.

CIRCULATION Group Vice-President, Margaret Phelan. Circulation Manager, Barbara Jeannetti.
Service Representative, Peggy Kelly. Assistant, Carmela Priante.

Computerworld can be purchased on 35 mm microform through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich.
48106. Phone: (313) 761-4700. Computerworld is indexed: write to Circulation Dept. for subscription information.

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, SEPTEMBER 21, 1983

All statistics compiled,
computed and formatted
by
TRADE QUOTES, INC.
Cambridge, Mass. 02139

TRADE QUOTES

1982-83 CLOSE PRICE WEEK WEEK
RANGE SEP 21 1983 NET CHNGE PCT

COMPUTER SYSTEMS

Q ALPHA MICROSYSTEMS	12-24	16	-1 1/4	-7.2
Q ALTO COMPUTER SYST	11-28	11 1/4	-1 1/2	-11.7
Q AMOHL LORP	9-30	18 7/8	+1 3/8	+7.8
Q APPLE COMPUTER INC	27-63	31 1/2	-1/8	-0.3
N AT&T	60-70	67 1/2	+1 1/8	+1.6
N BURRDUIGHS CORP	28-58	55	+1 1/2	+2.8
Q COMPUTER AUTOMATION	7-17	11 1/4	+1/4	+2.2
A COMPUTER CONSOLES	8-26	20 5/8	-5/8	-2.9
N CONTROL DATA CORP	21-62	51	-1 3/4	-3.3
Q CONVERGENT TECHNOL	22-41	25 3/8	+1 1/8	+4.6
N CRAY RESEARCH INC	20-52	44 7/8	+3 5/8	+8.7
N DATA GENERAL CORP	20-74	74 3/8	+7 5/8	+11.4
N DATAPoint CORP	11-36	25 3/8	+2	+8.5
N DIGITAL EQUIPMENT	62-132	106 1/4	+7 1/8	+7.1
A ERIQ INC	6-16	15 1/4	+1/8	+0.6
N ELECTRONIC ASSOC.	5-15	13 1/4	-3/8	-2.7
N FLOATING POINT SYST	16-44	34	+7/8	+2.6
N FOREORD	22-47	33 3/4	+1/2	+1.5
Q GENERAL AUTOMATION	3-16	12	+1	+9.0
N GOULD INC	31-44	34	-2 5/8	-7.1
N HARRIS CORP	20-51	37 1/4	+1/2	+1.3
N HEWLETT-PACKARD CO	22-48	45 1/4	+2 1/4	+5.2
N HONEYWELL INC	60-125	122 1/8	+4	+3.3
N IBM	57-126	123	+1/8	+0.1
Q IPL SYSTEMS INC	5-14	8 3/4	-1	-10.2
N LANIER BUSINESS PROD	12-21	19 1/8	+3/8	+2.0
N LVA CORP INC	22-35	28 1/4	+3/4	+2.7
Q MAGNUSON COMP SYST	2-5	7/8	0	0.0
N MANAGEMENT ASSIST	7-18	10 7/8	+1/4	+2.3
N MATSUSHITA ELEC(AOR)	47-74	68 1/2	+1 5/8	+2.4
N MODULAR COMPUTER SYS	6-16	14 1/4	+1/4	+9.6
N MOHAWK DATA SCI	10-19	13 3/8	+1/2	+3.8
N MOTOROLA INC	82-148	138 1/2	+3 1/4	+2.4
N NAT'L SEMICONDUCTOR	22-80	34 7/8	+4 3/8	+8.6
N NCR	38-128	123 7/8	+3 3/4	+3.1
N PERKIN-ELMER	17-37	36	+1/8	+0.3
N PRIME COMPUTER INC	11-30	16 1/2	+1 5/8	+10.9
N SPERRY CORP	21-46	45 5/8	+2	+4.5
Q TANDEM COMPUTERS INC	14-36	35 7/8	+3 3/8	+10.3
N TANDY CORP	37-65	43 5/8	+2 5/8	+6.4
Q TELEVIDEO SYSTEMS	18-41	18 1/2	-3 1/4	-14.9
N TEXAS INSTRUMENTS	71-176	116 3/4	-2 7/8	-2.4
Q VECTOR GRAPHICS INC	4-14	4	-1/8	-2.8
A WANG LABS "B"	13-42	34 1/2	+3 1/4	+10.3
A WANG LABS "C"	11-42	34 1/8	+3 3/8	+10.9
N XEROX CORP	35-50	44	0	0.0

LEASING COMPANIES

Q BOOTHE FINANCIAL CP	11-30	28	0	0.0
N COMDISCO INC	7-42	39 7/8	+1 1/2	+3.9
Q CONTINENTAL INFO SYS	3-10	13 1/4	1	-7.0
N DFF INC	5-14	13	-5/8	-4.5
N U.S. LEASING	18-47	41 1/2	+3	+7.7

NOTE: N=NEW YORK; A=AMERICAN; P=PACIFIC; B=BOSTON;
L=LOS ANGELES; M=MIDWEST; O=OVER THE COUNTER
ALL PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

1982-83 CLOSE PRICE WEEK WEEK
RANGE SEP 21 1983 NET CHNGE PCT

SOFTWARE & EDP SERVICES

Q ADVANCED COMP TECH	1-8	4 3/4	-1/4	-5.0
Q ADVANCED SYSTEMS INC	6-22	17 3/4	-3/4	-4.0
Q AGS COMPUTERS INC	7-32	27 1/2	+1 3/4	+6.7
Q AMERICAN SOFTWARE	21-31	28	+2 3/8	+9.2
N ANACOMP INC	9-23	9 1/4	-2 3/4	-22.9
Q ANALYSTS INTL CORP	5-20	12	-1	-7.6
A APPLIED DATA RES.	8-37	30	+1 3/4	+6.1
Q ASK COMPUTER SYSTEMS	6-21	20 1/4	-1/2	-2.4
B ASTRAOYNE COMP INC	1-7	3 3/4	-1/4	-6.2
N AUTOMATIC DATA PROC	21-44	37 1/2	-1/2	-1.3
Q CGA COMPUTER ASSOC	5-15	14 1/4	+1/2	+3.6
Q COMPUTER ASSOC INT'L	6-35	31 3/4	0	0.0
Q COMPUTER HORIZONS	8-20	12	-3/4	-5.8
Q COMPUTER NETWORK	4-10	7 1/2	+1/8	+1.6
N COMPUTER SCIENCES	11-23	16 7/8	-7/8	-4.8
Q COMPUTER TASK GROUP	8-22	15 1/2	-1/4	-1.5
Q COMPUTER USAGE	2-22	12 1/2	-1/4	-1.9
Q COMPUTONE SYSTEMS	8-38	9	-1/4	-2.7
Q CONSERV CORP	7-20	8 3/4	+1 1/2	+20.6
Q CONSHARE	7-13	11 1/8	-3/4	-6.3
N CULLINET SOFTWARE	12-50	47 3/8	+4 1/2	+10.4
Q CYCARD SYSTEMS INC	9-27	20	-1/2	-2.4
N ELECTRONIC DATA SYST	10-42	36 1/4	-1/4	-0.6
Q HODAN SYSTEM INC	27-53	50 1/4	+2	+4.1
N GENERAL ELECTRIC CO	45-58	50 1/8	+1/8	+0.2
N GTE CORP	38-48	43 3/4	+1 1/2	+3.5
N INFORMATICS INC	10-34	26 1/8	+7/8	+3.4
Q INFOTRON SYSTEMS COR	25-43	37	+2 1/2	+7.2
Q KEANE ASSOCIATES	4-15	10 1/4	0	0.0
A LOGICON	8-30	28 1/8	+3/8	+1.3
Q HCI COMMUNICATIONS	15-34	17 1/4	+1	+6.1
Q MGT SCI AMER INC	8-33	29 3/4	+3/4	+2.5
Q MATHEMATICAL APP GRP	12-22	14 1/2	-1/2	-3.3
Q NICOM SYSTEMS INC	25-50	46 1/2	+3 1/2	+8.1
Q MONCHIK-WEBER CP	10-22	12 1/2	+1 1/4	+11.1
Q NATIONAL DATA CORP	5-26	18 1/8	+5/8	+3.5
Q ON-LINE SOFTWARE INT	19-27	23 1/2	0	0.0
Q PANSOPHIC SYSTEMS	8-30	25 7/8	+3/8	+1.4
N PLANNING RESEARCH	6-21	15 1/2	-1/8	-0.7
Q POLICY MGMT SYST CP	36-68	61 3/4	+1 5/8	+2.7
Q PROGRAMMING & SYS	1-7	7 1/8	+3/8	+5.5
Q REYNOLDS & REYNOLD	17-53	47 3/4	-1/4	-0.5
Q SEI CORP	11-34	32 3/4	+3 3/4	+12.9
Q SHARED MEDICAL SYST	13-43	40 7/8	+2 1/2	+6.5
Q SCIENTIFIC COMPUTERS	6-14	12 1/4	-1/2	-3.9
Q SOFTWARE AG	5-17	11 1/8	+1 3/8	+14.1
N TYMSHARE INC	12-30	21 3/4	-4 1/2	-17.1
A URS CORP	5-18	14	-1/8	-0.8
N WYLY CDRP	7-17	12 1/4	-3/4	-5.7

COMPONENTS

N ADVANCED MICRO DEV	13-35	31 1/2	+2 3/4	+9.5
Q ADV'D SEMICONDUCTOR	12-34	31 1/4	+2 1/4	+7.7
N ANALOG DEVICES INC	18-42	41 1/4	+5/8	+1.5
Q ANALOGIC CORP	23-27	26 3/4	+2 1/4	+9.1
N APPLIED MAGNETICS CP	19-37	31 5/8	-1/8	-0.3
N TERADYNE	14-35	33	+1 1/2	+4.7

PERIPHERALS & SUBSYSTEMS

P AM INTERNATIONAL	2-7	6	+3/8	+6.6
A ANDERSON JACOBSON	9-26	12 1/2	-1 1/4	-9.0
Q AUTO-TROL TECHNOLOGY	8-29	23 5/8	+1 5/8	+7.3
Q BANCORP INC	7-33	16 1/4	-1/4	-1.5
A BEEHIVE INT'L	4-15	10 7/8	-3/8	-3.3
A BOLT-BERANEK & NEW	9-60	57 1/4	+7 1/4	+14.5
Q CARBEX CORP	2-4	2 3/8	-1/4	-8.5
N CENTRONICS DATA COMP	6-28	26 5/8	+1 3/8	+5.4
Q CETEC CORP	4-12	10	-1/2	-4.7
Q COGNITRONICS	2-20	11 1/8	-1/8	-1.1

1982-83 CLOSE PRICE WEEK WEEK
RANGE SEP 21 1983 NET CHNGE PCT

COMPUTER DEVICES INC

Q COMPUTER DEVICES INC	3-21	3 1/2	-1	-22.2
Q COMPUTER TRANSCIVER	4-12	6 3/8	-1/8	-1.9
N COMPUTERVISION CORP	19-53	51 3/4	+3 1/8	+6.4
N CONRAC CORP	17-38	19 3/8	+1/8	+0.6
A DATAPRODUCTS CORP	18-41	28	+1 1/2	+5.6
A DATARAM CORP	5-12	11 1/4	-1/2	-4.2
Q DATA SWITCH CORP	13-41	35	+2 7/8	+8.9
Q DATUM INC	2-17	12 3/4	+1 1/8	+9.6
Q DECISION DATA COMPUT	3-16	12 3/8	+1/4	+2.0
Q DECUTEL-OLIVETTI	18-39	22 7/8	+1 3/8	+6.3
N ELECTRONIC M & M	5-11	8 5/8	+3/8	+4.5
Q EVANS & SUTHERLAND	18-50	45 1/2	+1	+2.2
Q GANDOLF TECHNOLOGIES	9-22	9 7/8	-1/4	-2.4
N GEN'L DATA COMM INC	8-29	28 1/8	+3/8	+1.3
Q GREAT SOUTHWEST IND	2-6	1 3/4	0	0.0
N HAZELTINE CORP	7-31	26	+2 3/8	+10.0
Q IACOT CORP	3-10	5 3/8	-1/2	-8.5
Q INFORMATION INTL INC	10-22	17	-1/2	-2.8
Q INTEL CORP	11-45	43 3/4	+2 1/2	+6.0
Q IPL SYSTEMS INC	5-14	8 3/4	-1	-10.2
A LUNDY ELECTRONICS	7-19	12 7/8	+1/2	+3.7
Q MEGADATA CORP	9-15	12 3/4	+1 3/4	+15.9
A HSI DATA CORP	18-37	16 1/2	-1 1/4	-7.0
N NASHUA CORP	9-29	26	+3/8	+1.4
Q NETWORK SYSTEMS CORP	8-34	25 3/4	+2 1/2	+10.7
N NO AMERICAN PHILIPS	47-73	72 1/4	+2 3/4	+3.9
N NORTHERN TELECOM LTD	22-47	46 1/2	+1 3/4	+3.9
Q OMEX	3-6	6	0	0.0
N PARADYNE CORP	14-30	20 3/8	-1/8	-0.6
A PERMIL CORP	7-14	11	0	0.0
Q PHOENIX AMERICAN INC	7-17	14 1/4	+1/4	+2.0
N PLESSEY CO (ADR)	26-41	31 3/4	+1 3/8	+4.5
Q PRINTRONIX INC	24-34	25	-2	-7.4
Q RAHTEK CORP	12-26	15 1/4	-1 3/4	-10.2
N RAYTHEON CO	42-58	47 7/8	-3/4	-1.5
N RECOGNITION EQUIP	4-17	15	+1/4	+1.6
N ROLM CORP	40-80	64 5/8	+3/8	+0.5
N SANDERS ASSOCIATES	60-119	118 1/2	+8 1/2	+7.7
Q SCAN DATA	1-3	1 1/2	0	0.0
Q SCAN-TRON CORP	12-16	13 1/4	0	0.0
N SCIENTIFIC ATLANTA	15-23	17 1/2	-1/8	-0.7
N STORAGE TECHNOLOGY	16-33	20 5/8	+1 7/8	+10.0
Q SYKES DATATRONICS	6-27	6 1/2	+3/8	+6.1
Q SYSTEMS & COMP TECH	27-39	34	+3/4	+2.2
A T BAR INC	7-17	10 1/4	-1/2	-4.6
A TAB PRODUCTS CO	8-30	24 3/8	-2	-7.5
Q TANDON CORP	19-35	30 1/4	+1 1/2	+5.2
A TEC INC	6-12	8 5/8	-3/4	-10.1
N TEKTRONIX INC	34-87	82 1/8	+3 1/2	+4.4
N TELEX	5-32	27 3/8	+1/2	+1.8
Q TESDATA SYSTEMS CP	3-17	12 3/8	-1	-7.4
N TIMEPLEX INC	7-28	24	+2 5/8	+12.2
Q VISUAL TECHNOLOGY	9-26	19 3/4	-1/4	-1.2

SUPPLIES & ACCESSORIES

N AMERICAN BUS PRODS	11- 33	32 1/4	- 1/8	-0.3
N BARRY WRIGHT	13-31	30 1/2	+1	+3.3
A DUPLEX PRODUCTS INC	12- 26	23 5/8	+ 3/4	+3.2
N ENNIS BUS. FORMS	8- 25	22 1/2	- 1/8	-0.5
N 3M COMPANY	49- 80	80 5/8	+1 5/8	+2.0
N MOORE CORP LTD	26- 51	48 1/2	+2 1/2	+5.4
O STANDARD REGISTER	11- 34	31	+1 1/2	+5.5

INTRODUCING HIGH PERFORMANCE

Fame

Falco's new family of high performance terminals are loaded with standard features and options unmatched by anyone in the industry and are designed to meet the needs of today's ever demanding and fast-paced business environment.

Fame II offers:

- ANSI x.3.64
(ADM 31* & VT 52* Modes)
- 22 Non-volatile Function Keys
- Soft Set-up Screen
- Non-embedded Video Attributes
- Buffered Printer Port

options:

- Graphic Board (Tektronics Plot 10* Compatible)
- 212 Plus Modem (300/1200 Bps)
- 64K CP/M* Board
- Amber or B/W Screens
- IBM style Keyboard available on Fame II and Fame III.

Call now and discover what proven reliability and high performance can mean for your business needs today . . . and tomorrow!



Falco
DATA PRODUCTS

1286 Lawrence Station Road
Sunnyvale, CA 94089

15" Monitor Shown

ADM is a registered trademark of Lear Siegler, Inc. VT is a registered trademark of Digital Equipment Corp. Plot 10 is a registered trademark of Tektronics, Inc. CP/M is a registered trademark of Digital Research Corp.

(408) 745-7123